REPORT RESUMES

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A COMPARATIVE STUDY OF THE ACADEMIC ACHIEVEMENT OF ELEMENTARY AGE STUDENTS OF THE UNITED STATES AND THE BRITISH ISLES.

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A CROSS-CULTURAL STUDY WAS CONDUCTED TO COMPARE THE ACHIEVEMENT LEVELS OF BRITISH AND UNITED STATES ELEMENTARY SCHOOL STUDENTS IN GRADES 1-6, OF VARYING ABILITY LEVELS, FROM BOTH PRIVATE AND PUBLIC SCHOOLS AT THE APPROXIMATE BEGINNING, MIDDLE, AND END OF THE ACADEMIC YEAR. ACHIEVEMENT ANALYSES WERE BASED PRIMARILY UPON SCORES EARNED ON THE CALIFORNIA ACHIEVEMENT TEST, MODIFIED TO ELIMINATE CULTURALLY BIASED ITEMS. BRITISH-CONSTRUCTED, STANDARDIZED ACHIEVEMENT TESTS WERE USED PRIMARILY AS MEASURES OF THE VALIDITY OF THE CALIFORNIA ACHIEVEMENT TEST. VALIDITY COEFFICIENTS BETWEEN BOTH TESTS ON COMPARABLE SUBJECT-MATTER AREAS RANGED FROM 0.56 TO 0.89. SEVEN CONCLUSIONS WERE REACHED--(1) THROUGH THE FIRST FOUR GRADES, BRITISH PUPILS WERE AT HIGHER LEVELS OF ACHIEVEMENT IN NEARLY ALL SUBJECT AREAS AND ACROSS ABILITY LEVELS, (2) BY GRADES FIVE AND SIX, U.S. PUPILS WERE ACHIEVING AT APPROXIMATELY THE SAME LEVELS IN NEARLY ALL THE TESTED SUBJECT AREAS, (3) ON A COMPARATIVE BASIS, BRITISH PUPILS WERE STRONGEST IN ARITHMETIC FUNDAMENTALS AND U.S. PUPILS IN ENGLISH USAGE, (4) U.S. PUPILS SCORED COMPARATIVELY HIGHER ON U.S. TESTS, BRITISH ON BRITISH TESTS, (5) THE MARGIN BETWEEN HIGH AND AVERAGE ABILITY GROUPINGS WAS GREATER FOR THE BRITISH SAMPLE, (6) THERE APPEARED TO BE LITTLE DIFFERENCE BETWEEN THE ACHIEVEMENT OF PUBLIC AND PRIVATE SCHOOL PUPILS, AND (7) U.S. PUPILS WERE STRONGEST IN REASONING PROBLEMS, WHILE BRITISH PUPILS WERE STRONGEST ON METHOD PROBLEMS. (HB)

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REPORT OF

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U.S.O.E. PROJECT NUMBER: 2177

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CHAPTER I. INTRODUCTION

A. Problem

There is a recognized desire to improve the educational achievement of American youth at all age levels. Since educational systems beyond one's national boundaries suggest what is educationally possible, comparative studies are valuable in examining these possibilities. Anderson[1], writing in Education (October, 1963), states that "every educator will find a study of our educational system in relation to other systems imperative. He will be oriented far better to bring about improvements in the American educational system and to cooperate intelligently in the improvement of education in other parts of the world." Hilker[2] identified the most important step of the comparative process when he stated: "In the process of comparing, there are the three steps: a) the description of phenomena, b) the (analytic) explication of underlying forces, and c) the comparison in the narrower and specific sense.

...... The third step, i.e. comparison in the narrower sense, is the most important one, and the one least attempted so far. Description and explication actually attain their final value in comparison. In its simplest form, the latter consists of the juxtaposition of quantitative data which reflects decrease, increase or no change. When, however, qualitative differences are under study, it is necessary to seek to find a common denominator, before a decision about the direction of further procedures can be made. This kind of comparison has barely been practiced as yet, but the comparative method hardly deserves its name unless it progresses to this level of operation. In fact, this advance is essential for the recognition of comparative education as a scientific discipline and as a field of significance for practical application in solving many vital issues."

Kozamias[3] pointed out that "Very often comparative educators proceed to indicate the different methods of selection and the different institutional patterns which seek to accomplish this goal. But they very rarely seek to establish whether in fact England or France provides better treatment according to the age, abilities, and aptitudes of a student."

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[1] Anderson, E. Dean, "Importance of Comparative Education" Education, October, 1963

[2] Hilker, Franz, "What Can the Comparative Method Contribute to Education?" Comparative Education Review, Vol. 7, No. 3, Feb., 1964, pp. 223-225.

[3] Kozamias, Adreas M., "Some Old and New Approaches to Methodology in Comparative Education," Comparative Education Review, Vol. 5, #2, Oct., 1961

Foshay[4], writing in the International Review of Education (Volume IX, 1963-64) suggests that large-scale empirical studies on an international plane are feasible, and that such studies can shed light on the nature of educational achievement as related to national cultures and traditions. However, as pointed out in the introduction to Educational Achievements of Thirteen Year Olds in Twelve Countries[5], "The number of cross-country comparisons of school achievement is small, and the findings limited. Typically, such studies have involved two populations somewhere in the middle of their respective school careers, and achievement has been compared in one school subject."

The achievements of our elementary age pupils as they develop their basic educational background is of particular concern. This concern has been heightened since the advent of Sputnik by the claims and counterclaims of the critics and defenders alike of the educational achievements of American youth. The critics have in particular belittled the achievements of our youth compared to their chronological counterparts in the European systems in general and the English system in particular. Theoretically, the typical English school youth (1) move ahead at a fast pace and by age eleven are one-to-two years ahead of American children completing the sixth grade, (2) is better adjusted to school in particular and life in general, (3) is a healthier physical specimen, and (4) achieves this in a school environment and physical plant devoid of curricular "frills" and structural "ginger bread." The usual conclusions of this group are that our educational system needs a total overhauling on a "crash basis."

The staunchest defenders of the American Educational System deny the charges and, claim in addition, that it engenders greater creativity, leadership, development and individual initiative. They admit to the desire of modest changes but also put us on guard to preserve in a large degree our educational "status quo." On those rare occasions when the smoke clears from the battlefield of this "academic Bull Run" there appears to be a surprising lack of objective data substantiating either viewpoint. What had not heretofore been attempted, even on a limited basis, was a comparison that would assess the influences educational practices in England and the United States might have on the basic subject matter areas of arithmetic, reading, and English-usage on a continuum of grades one through six, thus noting the cumulative effects of educational practices at each successive grade level. This study reports such an investigation.

---

[4] Foshay, A. W., International Review of Education, Vol. IX, 1963-64.

[5] Foshay, A. W., Thorndike, R. L., et. al., Educational Achievements of Thirteen Year Olds in Twelve Countries, UNESCO, N. Y., 1962

B. Objectives

This study proposed to test the hypotheses (1) that significant differences would be found between students' mean achievement in the areas of arithmetic, reading and English usage for British and American students (a) of high, average, and low ability, and (b) attending private and public institutions; (2) that there are specific periods during the first six years of education (excluding nursery and kindergarten) wherein the measured achievement of British children in arithmetic, reading, and English usage begins to accelerate beyond that demonstrated by American children.

The collection, tabulation, and analyses of the data in the support or rejection of the above hypotheses may provide evidence to warrant further study of the associated factors or practices that produce the differences in achievement. Further, it is believed that the evidence collected in this project will stimulate additional research in these or other subject-matter areas leading to the identification of possible educational practices that could improve elementary education in the United States.

CHAPTER II. RELATED RESEARCH

In the development and execution of this investigation particular attention has been given to research in cross-cultural studies and comparison of academic achievement, especially between English-speaking countries. Conclusions have not always been the same. For example, Buswell[1] in 1958 reported that English pupils made significantly higher scores than California pupils of the same chronological age when using an adapted form of a British achievement test. Using the same British tests that Buswell used, Tracy[2] in 1959 reported that white eighth grade North Carolina pupils at the same stage (near completion) of arithmetic study as their British counterparts received approximately the same mean scores. Bogut[3] replicated Buswell's study in the elementary schools of St. Paul, Minnesota, and noted that the St. Paul students had lower means on the computational, and higher and more comparable means with the British sample on the problems parts of the arithmetic achievement test. He, therefore, concluded that these scores reflected a meaningful approach to the teaching of arithmetic in American Schools.

Duncan[4] compared the teaching of arithmetic in the United States and New Zealand (1961) by administering both a standardized and a teacher-made test to 200 twelve-year-olds. The American pupils achieved slightly higher results and he also concluded that the more meaningful teaching methods of the American teachers produced the better results in both computations and problem-solving.

William A. Brownell[5] in his, "Observations of Instruction in Lower-Grade Arithmetic in English and Scottish Schools," stated his opinion that English and Scottish children in the first six grades are learning more arithmetic than are American children. He arrived at the conclusions that (1) we have seriously underestimated the attention span of school beginners; (2) likewise, we have seriously underrated the "readiness" of school beginners for systematic work in arithmetic; and (3) we can safely ask children in the lower grades to learn much more arithmetic than we are now asking them to learn.

---

[1] Buswell, G. T., "Comparison of Achievement in Arithmetic in England and Central California," Arithmetic Teacher, Feb. 58, P1-9.

[2] Tracy, N. H., "Comparisons of Test Results: North Carolina, California, and England," Arithmetic Teacher, Oct. 59, P. 199-202.

[3] Bogut, T. L., "Comparisons of Achievement in Arithmetic in England, California, and St. Paul," Arithmetic Teacher, March 59, P. 87-94.

[4] Duncan, E. R., "Teaching Arithmetic in The United States and New Zealand," Comparative Education Review, June 61, p. 59.

[5] Brownell, William A., "Instruction in Lower Grade Arithmetic in English and Scottish Schools," Education Digest, Sept. 1960, p. 36.

Foshay[6] and others, in the study, Educational Achievement of Thirteen Year Olds in Twelve Countries, sought to determine whether some indications of the intellectual functioning behind responses to short answer tests could be deduced from an examination of the patterning of such responses from many countries, and to discover the possibilities and the difficulties attending a large-scale study. They concluded that: (1) the data obtained, even under the restrictions that inevitably arise, can be analyzed fruitfully, and, by extension, that it is possible to introduce a large empirical element into comparative education--an element only slightly present in the field until now; and (2) a large scale project, which depends on similarities in technical and philosophical assumptions in education and in measurement, can be done.

Some of the findings reported were as follows:

(1) On the mathematics test, all the French-speaking countries were superior performers, with Belgium leading the way. Poland also showed up to an advantage. The English-speaking countries were consistently poor. Yugoslavia also had marked difficulty with this test.

(2) National differences in reading comprehension were relatively small, with Yugoslavia showing up to best advantage, followed by Scotland and Finland, while Belgium and Poland did relatively poorly.

(3) On the geography test Germany, Israel and Poland lead the way. Their superiority was especially marked in that section of the test dealing with geographic information. The English-speaking countries did poorly on the geography test as a whole, and especially on the sub-test dealing with geographical facts and information. This is an area in which the different national curricula appear to have produced distinctly different results.

(4) Science is an area in which the French-speaking countries were relatively weak. Here the leaders in relative achievement are the United States and Germany, with Yugoslavia and England following in that order.

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[6] Foshay, Arthur W., et al, Educational Achievements of Thirteen-Year-Olds in Twelve Countries, UNESCO Institute for Education, Hamburg, Germany, 1962, p. 7.

Anderson[7], and others reported (1963) a study entitled "Comparisons of the Reading and Spelling Achievement and Quality of Handwriting of Groups of Scottish and American Children" which gives the results of an investigation to obtain evidence of the different educational practices in Scotland and the United States. Samples of the school populations were taken in West Lothian; Jackson, Michigan; and Pinellas County, Florida, at ages seven, eleven, and fourteen years. Tests in handwriting, spelling, oral reading, paragraph and word meaning were administered to each group, and the results compared. At age seven the Scottish children were found to have a higher standard of attainment on all tests. At age eleven much the same results were found; however, at age fourteen, the American students were significantly higher in the paragraph and word meaning tests. As the tests were of American origin it was possible to compare the achievement of the Scottish pupils with the American norms.

Several other comparisons have been made utilizing test norms of one nationally developed test for comparing with the achievement of another national group. In 1950 Taylor[8] administered the Metropolitan Readiness Tests to pupils in Fife and Edinburgh, Scotland. These pupils achieved a mean age score approximately 1 year, 2 months above the American norm for their age-ability group. Scholl conducted two studies of this nature. In the first[9] (1960) she administered the paragraph meaning, word meaning, and spelling subtests of the Stanford Achievement battery, were administered to group of English children, ages 7, 9, 11 and 13. The English pupils performed above the norms on all tests at all ages except the paragraph meaning test where they excelled at age 7 only. Her second study investigated the performance of American children, ages 7, 9, and 11, on the Survey Reading Tests of the National Foundation for Educational Research in England and Wales and the Schonell Spelling Test. The samples tested fell below the English norms at all ages.

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[7] Anderson, Irving H., Comparisons of The Reading and Spelling Achievement and Quality of Handwriting of Groups of English, Scottish, and American Children, Cooperative Research Project No. 1903, The University of Michigan, 1963.

[8] Taylor, Christian D. "The Effect of Training on Reading Readiness, Studies in Reading, Vol. 2, London: University of London Press, Ltd., 1950.

[9] Scholl, Geraldine T., The Reading and Spelling Achievement of a Group of English Children as Judged by The Standards on an American Achievement Test, unpublished Doctoral dissertation, U. of Michigan, 1960.

In 1958, Pidgeon[10] compared the performances of eleven-year-old children from Australia and England and Wales on reading, arithmetic, and non-verbal ability tests. In each of these tests, it was found that the standard deviation of test scores obtained by the English and Welsh children was considerably greater than that of the Australian sample. It was "cautiously" concluded that the results might be due to differences in the methods and approach employed in teaching the different subjects and not to any overall differences in organizing classes by "streaming" or other methods.

Lloyd and Pidgeon[11] reported another investigation in 1961 in which a non-verbal test, standardized in England, was given to groups of African, European and Indian children in Natal, South Africa, revealed considerable lower standard deviations in that country. It was observed that the system of class organization employed in Natal meant that "no child can proceed from one class to another unless he can pass the examination set for that class. Such a system inevitably has repercussions on the methods of teaching employed and the concern of a teacher in Natal is to get as many through the examination as possible, since too many failures might reflect on his efficiency. This leads to mass methods of teaching and to a complete lack of recognition of individual differences." It might be mentioned here that the very opposite occurs in England. Teachers are trained to recognize individual differences and to adjust their teaching accordingly, and indeed, the system of streaming is a further aid to this end. The system employed in Natal is used with all ethnic groups but "its effect is more pronounced with the African and Indian children in view of their larger school classes." The results reported reflected this, in that the standard deviations tended to be smaller with these groups, particularly with the African children.

Comparative studies have also been conducted in other related areas of education. Mitchell[12] (1962) compared the concept and development of guidance programs in the United States and thirteen European-Mediterranean countries. She concluded that pupil guidance was beginning to be recognized as an educational technique for meeting certain societal needs resulting from changing educational, family, and economic characteristics in these countries. At this point, it appeared to closely parallel the early stages of its development in the United States, being oriented towards vocational direction and psychological testing. In a later study, Mitchell[13] (1964) compared the organizational structures and provisions for pupil personnel services in selected school systems of the United States, England, Scotland, and Northern Ireland. Among the comparisons noted are:

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[10] Pidgeon, D.A., "A Comparative Study of Basic Attainments," Educational Research, Vol. 1, No. 1, 1958.

[11] Lloyd, F. and Pidgeon, D.A., "An Investigation Into the Effects of Coaching on Non-Verbal Test Material With European, Indian, and African Children," British Journal of Educational Psychology, 31, 145-151.

[12] Mitchell, Marianne H., "A Survey of Guidance Activities in Selected Foreign Countries," (unpublished Masters project) University of Toledo, 1962.

(1) The school pupil personnel specialists more frequently are members of a unit staff (county, district, etc.) than of a specific school faculty in the British Isles.

(2) In the United States, such workers were usually employed by school systems only, whereas in the United Kingdom, they were often employed through other governmental, county, or educational agencies.

(3) Guidance counselors were "non-existent" in the school systems surveyed in the British Isles.

During the period 1952-57, Anderson, Anderson, Cohen, and Muth conducted a study evaluating the image of the teacher by adolescent children in four countries: Germany, England, Mexico, and the United States. It was concluded that children's images of teachers is a function of cultural pattern.

Studies of teachers and teacher education have also been conducted. Rempel[14] reported a study comparing the relative status of the United States and Canadian teachers. He reported salaries for high school teachers are a little higher in Canada than in the United States, on the average, but salaries for elementary school teachers are higher in the United States. However, these differentials can largely be attributed to differences in certification requirements in the two countries. The salary discrepancies tend to disappear when salary schedules are compared and levels of preparation and experience are equated. College and university salaries are somewhat higher, on the average, in Canada. In 1948 in both countries, teacher salaries were approximately equivalent to the earnings of all persons working for wages and salaries.

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[13] Mitchell, Marianne H., "A Comparison of Pupil Personnel Services in Selected School Systems of the United States, England, Scotland, and Northern Ireland," (unpublished Doctoral dissertation) University of Toledo, 1964.

[14] Rempel, A. M., "The Relative Status of United States and Canadian Teachers," Phi Delta Kappan, April, 1961, Pp. 296-301.

Employees in manufacturing and civilian employees in the federal government, were earning somewhat more, on the average. However, teachers have made stronger relative gains in Canada since 1948. In both countries the teaching profession has a long way to go to reach the income levels of other professional groups.

Dickson, Prediger, Wiersma[15], and others are currently concluding a study comparing "The Characteristics of Teacher Education Students in the British Isles and the United States." The principal purpose of the study is to determine: (1) teacher attitude and personality characteristics; (2) general educational preparation; (3) professional education knowledge; and (4) general intelligence or pre-service teacher education students in both countries. Emphasis was placed upon examing the products of the teacher education programs at various stages in their training.

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[15] Dickson, G.E., Prediger, D., Wiersma, W., "The Characteristics of Teacher Education Students in the British Isles and the United States," U. S. O. E. Coop. Research Project, 1964-65.

CHAPTER III. EDUCATIONAL STRUCTURE IN THE UNITED STATES AND THE BRITISH ISLES

A. Broad General Administrative Structure of Education

In order to understand the educational setting in which the academic achievement of elementary age pupils were measured, it seems desirable to include some minimal background descriptions. This chapter, therefore, presents a broad overview--not intended as a comprehensive review--of the general administrative structure of education in both nations as well as the organizational patterns commonly found in each of the participating countries.

(1) U. S. A.

In the United States, the state is the governmental unit which is responsible for the development and general control of systems of public schools; however, the states do not actually operate the schools. Even though the state is regarded as the legally responsible agency for the development of the school system, the state legislatures have created school districts and have delegated to them full power to operate the public school system within their respective jurisdictions. Within each school district there is a board of education ordinarily composed of three, five or seven members, who are elected to their positions by the citizens of their respective educational communities. This administrative structure allows the people to actively participate in school matters at the local school district level. The people in the United States hold very zealously to their local schools and to their rights as citizens to participate in decisions about what the schools shall do. The legal power conferred upon local boards of education reflects America's firm conviction of the advantages of local government. This local delegation of power is also an expression of one of the basic assumptions of the country: that a well-informed citizenry, utilizing democratic processes, can make good decisions.[1].

These boards of education, in turn, ordinarily employ a superintendent of schools, to serve as their chief executive and professional adviser. The superintendent of schools within a school district can be defined as the chief administrative officer of the administrative unit which operates public schools. He is directly responsible to a local board of education, and is the executive officer of the local board of education. Working under the superintendent within the central unit if a school district there may be many categories of assistant superintendents and other top-level administrative personnel.

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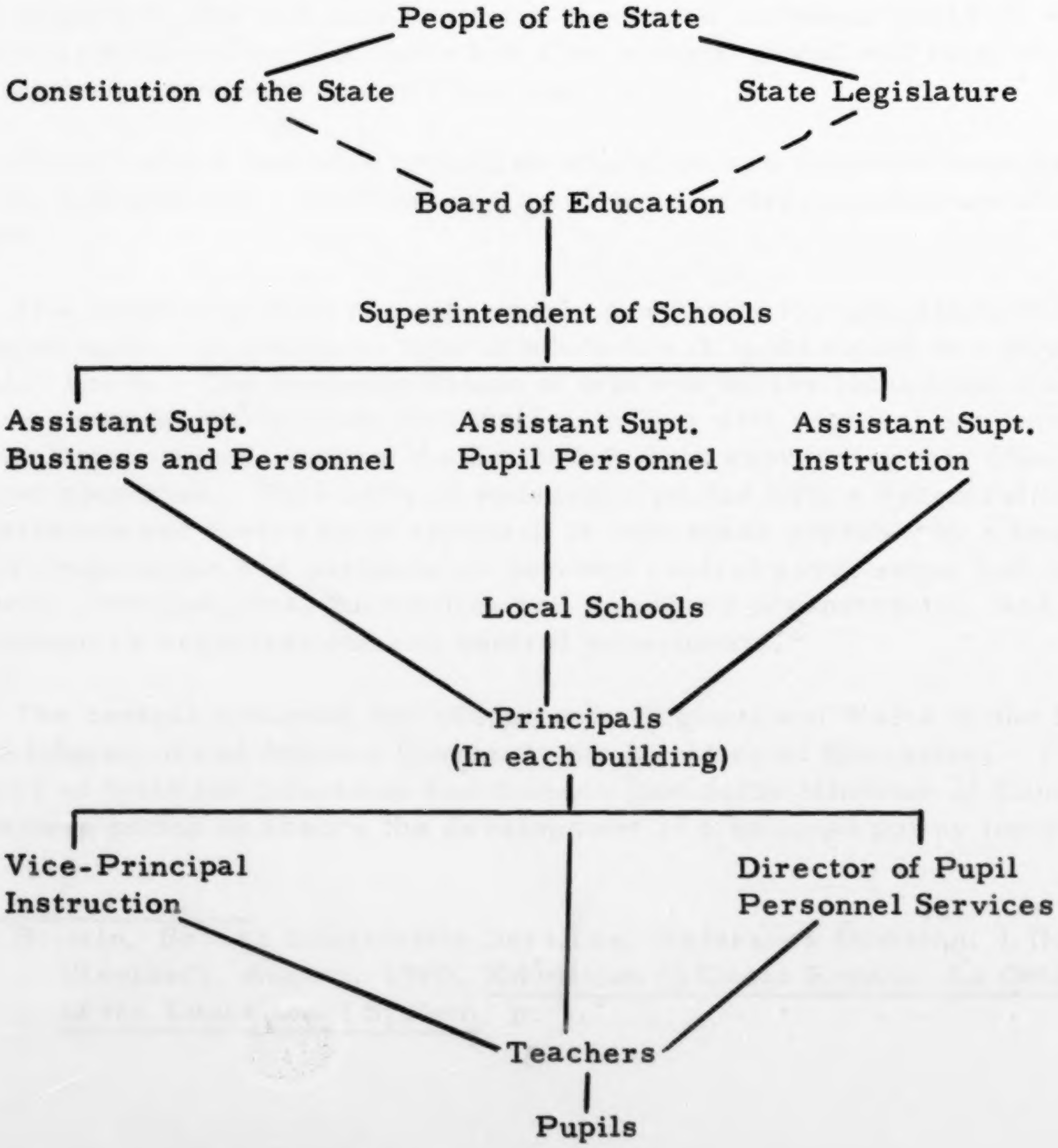
[1] Roald F. Campbell, John F. Corbally, Jr., and John Ramseyer, Introduction to Educational Administration (Boston: Allyn and Bacon, Inc., 1958), p. 36.

Each school within a district has a principal whose basic responsibility is to direct the educational program of the school which he heads. Depending on the size of the institution, a principal may have, serving directly under him, one or more assistant or vice-principals, as well as other supervisory, pupil personnel, or administrative personnel who are dedicated to working with the instructional staff and pupils in their respective schools.

In Figure one, the general administrative structure of education which is typically found in the United States has been drawn.

Figure 1.

Diagram of General Administrative Structure of Education in the United States


People of the State
Constitution of the State
State Legislature
Board of Education
Superintendent of Schools
Assistant Supt. Business and Personnel
Assistant Supt. Pupil Personnel
Assistant Supt. Instruction
Local Schools
Principals (In each building)
Vice-Principal Instruction
Director of Pupil Personnel Services
Teachers
Pupils

(2) Great Britain

Before noting the pattern of educational administrative structure in the United Kingdom, it must be recognized that the United Kingdom consists of four distinct and separate countries: England, Wales, Scotland, and Northern Ireland. Because the historical and religious development of these separate countries has been different and because each possesses a cultural heritage of which it is proud, separate educational systems have come into being with very real traditions and characteristics of their own. Administratively, England and Wales comprise one educational administrative unit with Scotland and Northern Ireland each having separate units also. For example, the Department of Education and Science (formerly Ministry of Education) in London has no authority in Scotland, where the Scottish Education Department is the appropriate department. Similiarly in Northern Ireland the educational authority is its own Ministry of Education. Diversity and variety of approach are probably among the most striking features of British education, for not only are there the broad divisions based on national and cultural differences, but there are also many regional and local variations reflecting local traditions and preferences.

Other notable features of British education are the prominent part played by voluntary organizations and the degree of decentralization of administration.

The national goal is not only equal opportunity for education, but also equal opportunity for whatever type of education is most suited to a pupil's particular needs. The implementation of this aim on the local level may vary; for example, in Scotland and Wales, in line with regional sentiment, implementation varies, just as the Education Acts expressing this ideal vary in the two countries. This unity of endeavor coupled with a decentralized administration and diversity of approach is only made possible by a long tradition of cooperation and partnership between central government and local authorities, between local authorities and voluntary organizations, and between voluntary organizations and central government.[2]

The central authority for education in England and Wales is the Department of Education and Science (formerly the Ministry of Education). The Secretary of State for Education and Science (formerly Minister of Education) has effective power to assure the development of a national policy for education.

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[2] Great Britain, British Information Services, Reference Division, I.D. 606 (Revised), August, 1960, Education in Great Britain: An Outline of the Educational System, p. 1.

The staff of the Department of Education and Science consists of a body of permanent civil servants with a Secretary of State for Education and Science at their head. The staff is divided into the headquarters administrative officers, and inspectors, whose work lies mostly in the areas of the Local Education Authorities. The work of the inspectors in England and Wales is, briefly, as follows: 1) to inspect and report on the efficiency of schools; 2) to serve as local representatives of the Secretary in administrative matters; and 3) to act as the expert advisers of the Secretary in matters of educational theory and practice.[3]

In England and Wales there are 146 Local Education Authorities (L.E.A.'s). These consist of the Councils of sixty-two counties, eighty-three county boroughs, and one joint board representing the area of a county and borough combined. The Councils are local government bodies, locally elected, which are concerned with many services other than education. Each Council must establish an education committee, to which it entrusts its educational work. The majority of the committee members must be Council members, but the committee must also include other people experienced in the field of education.[4]

In Scotland, the Secretary of State for Scotland is responsible to Parliament for the administration of the Scottish Education Department. This Department has an administrative staff and Inspectorate, similar to that in England and Wales. An Advisory Council on Education in Scotland reports to and advises the Secretary of State on educational matters. There are thirty-five Education Authorities, similar to the Local Education Authorities in England and Wales, who are responsible for the local provision of education.[5]

In Northern Ireland, the Central Authority for education is the Ministry of Education. The councils of each of the six counties and of the two county boroughs are the Local Education Authorities for their areas.[6]

In the United Kingdom the Local Education Authorities, (L.E.A.'s), are county councils and county borough councils. The Councils are local government bodies, locally elected, which are concerned with many services other than education. Each Council must establish an education, to which it entrusts its educational work. The majority of the committee members must be Council members, but the committee must also include other people experienced in the field of education.

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[3] Ibid., p. 7.
[4] Ibid., p. 8.
[5] Ibid., p. 26.
[6] Ibid., p. 29.

Each "L. E. A." is responsible for seeing that there is a full range of educational opportunity, through all the three stages of primary, secondary, and further education, according to the terms of the Education Act of 1944. However, where some of the county units are likely to be too large to keep in close touch with local circumstances, provision is made for them to delegate certain functions, in respect of primary and secondary education, to specially constituted "divisional executives" which are not normally responsible for an area with a population of less than 60, 000.

Figures two, three and four diagram the general administrative structure of education in England, Scotland, and Northern Ireland respectively. As can be noted in the charts, the structure is similar in the three countries.

Figure 2.

Diagram of General Administrative Structure of Education in England

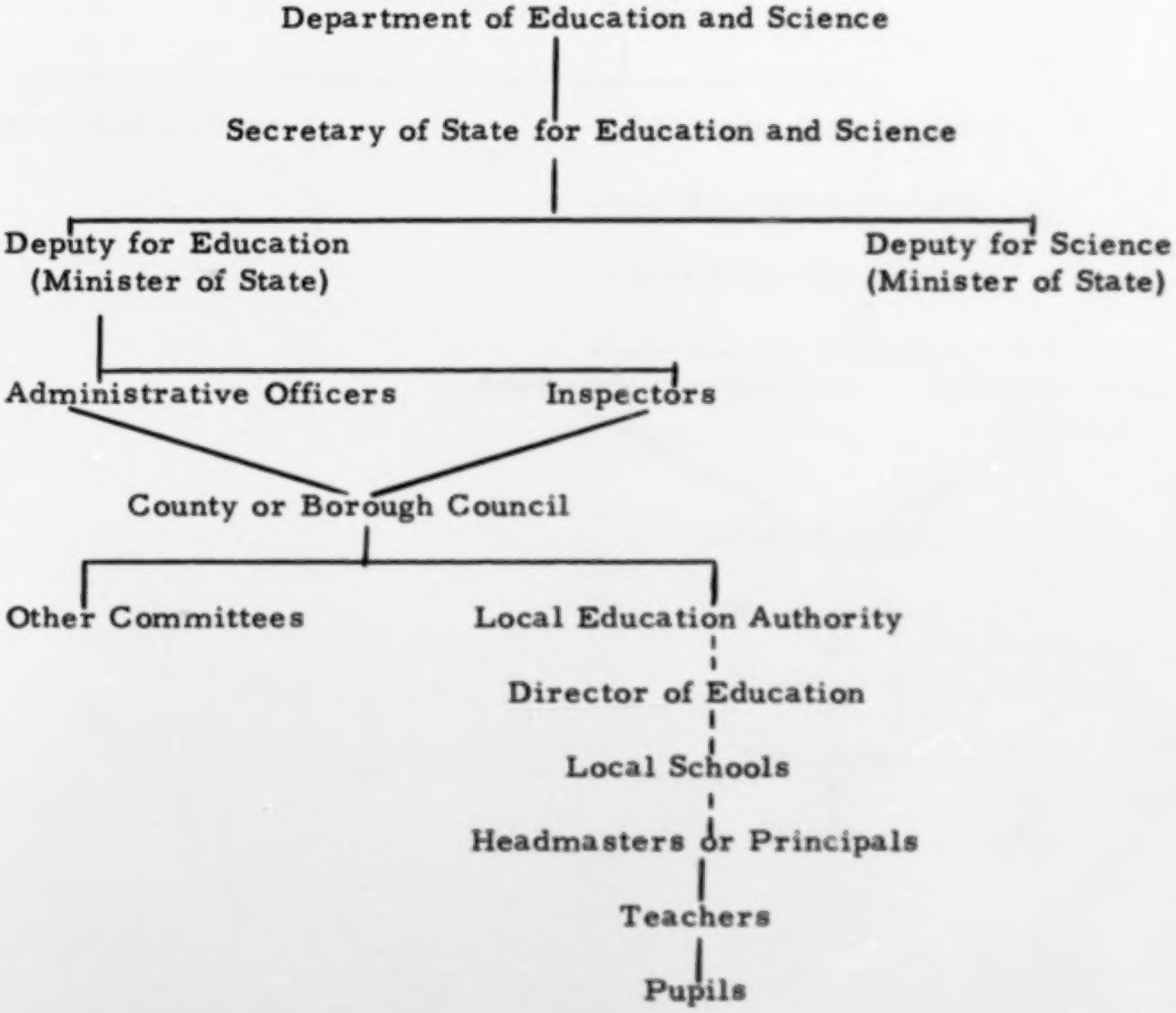

Department of Education and Science
Secretary of State for Education and Science
Deputy for Education
(Minister of State)
Deputy for Science
(Minister of State)
Administrative Officers
Inspectors
County or Borough Council
Other Committees
Local Education Authority
Director of Education
Local Schools
Headmasters or Principals
Teachers
Pupils

Figure 3.

Diagram of General Administrative Structure of Education in Scotland

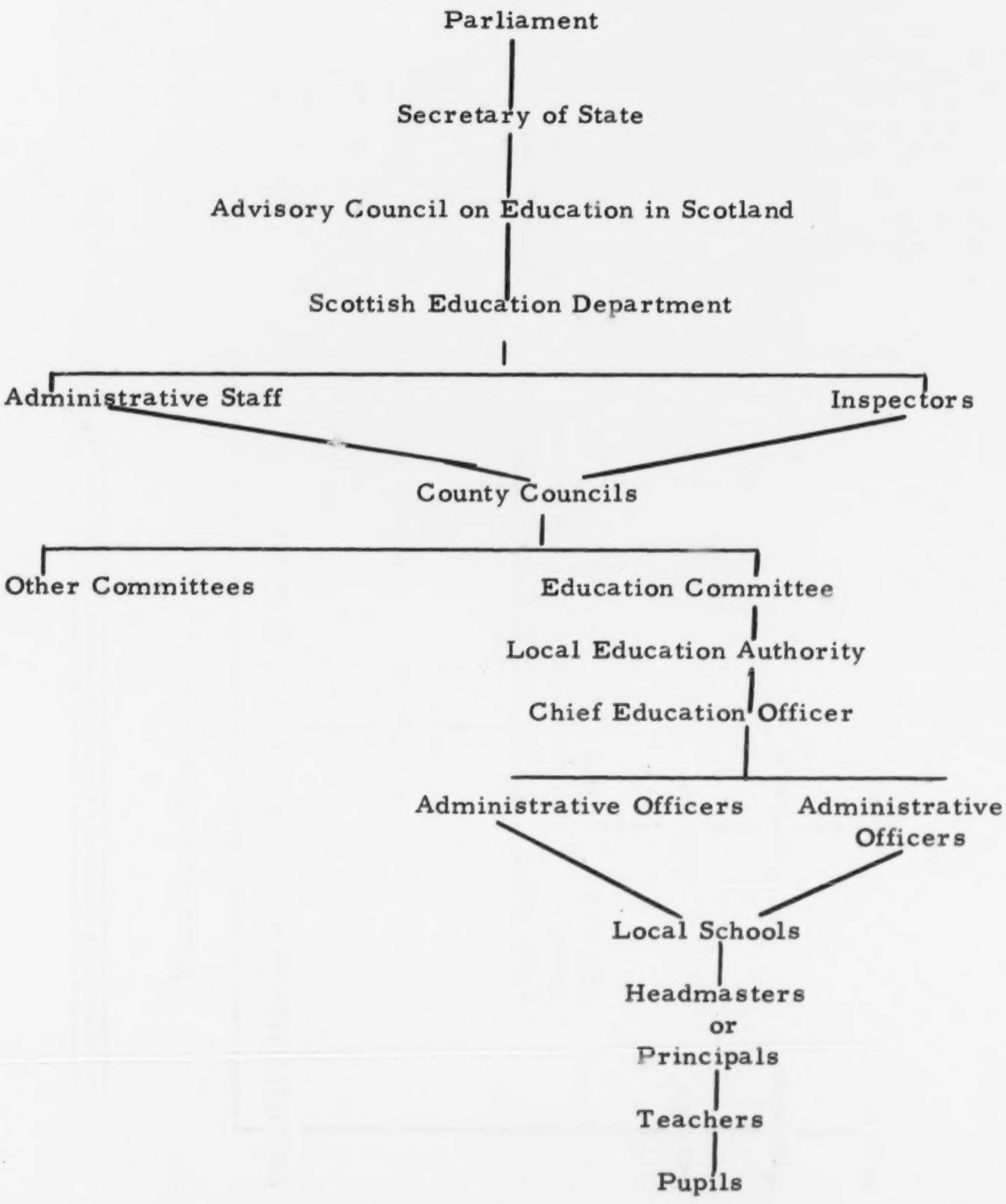
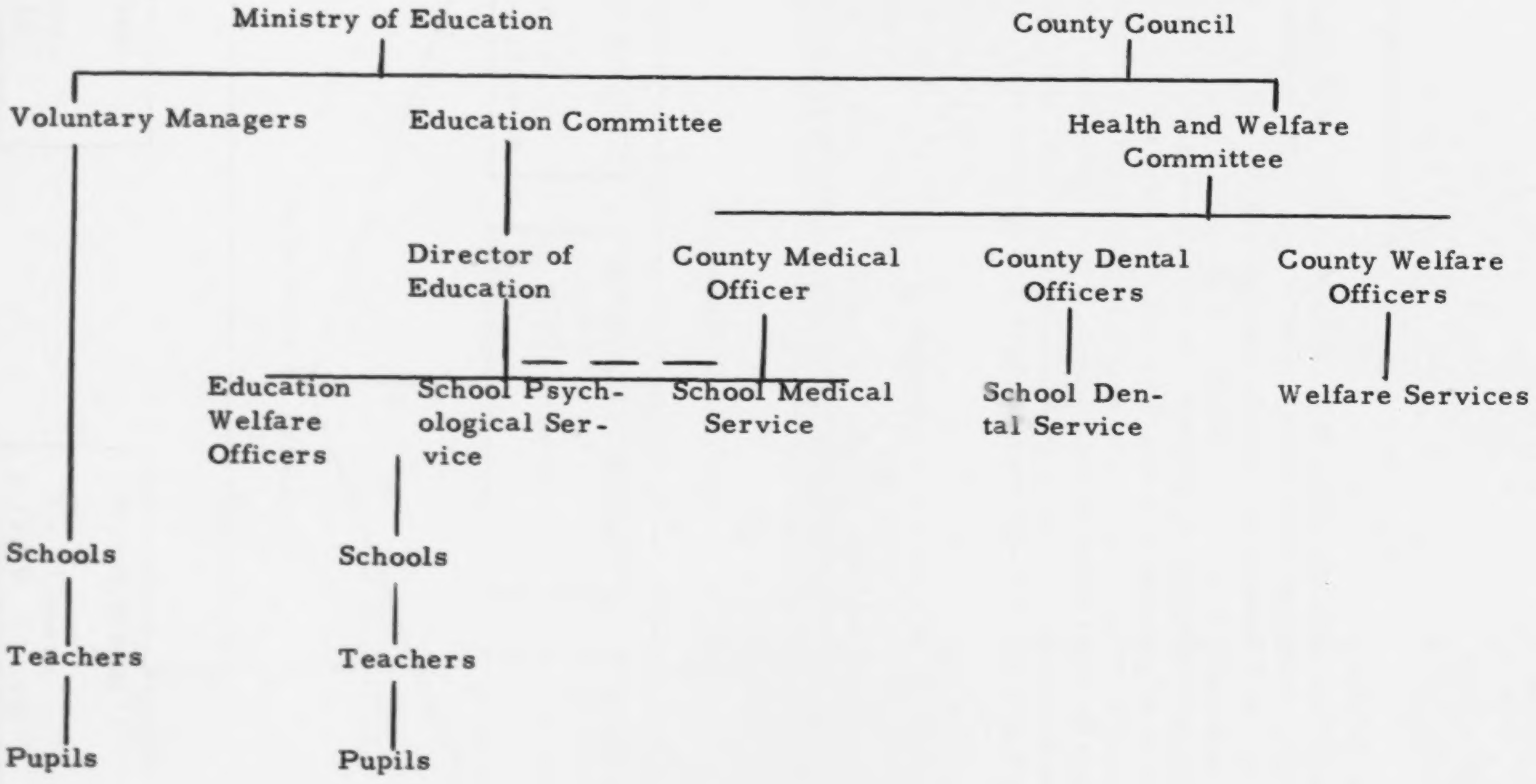

Parliament
Secretary of State
Advisory Council on Education in Scotland
Scottish Education Department
Administrative Staff
Inspectors
County Councils
Other Committees
Education Committee
Local Education Authority
Chief Education Officer
Administrative Officers
Administrative Officers
Local Schools
Headmasters or Principals
Teachers
Pupils

Figure 4.

Diagram of General Administrative Structure of Education in Northern Ireland

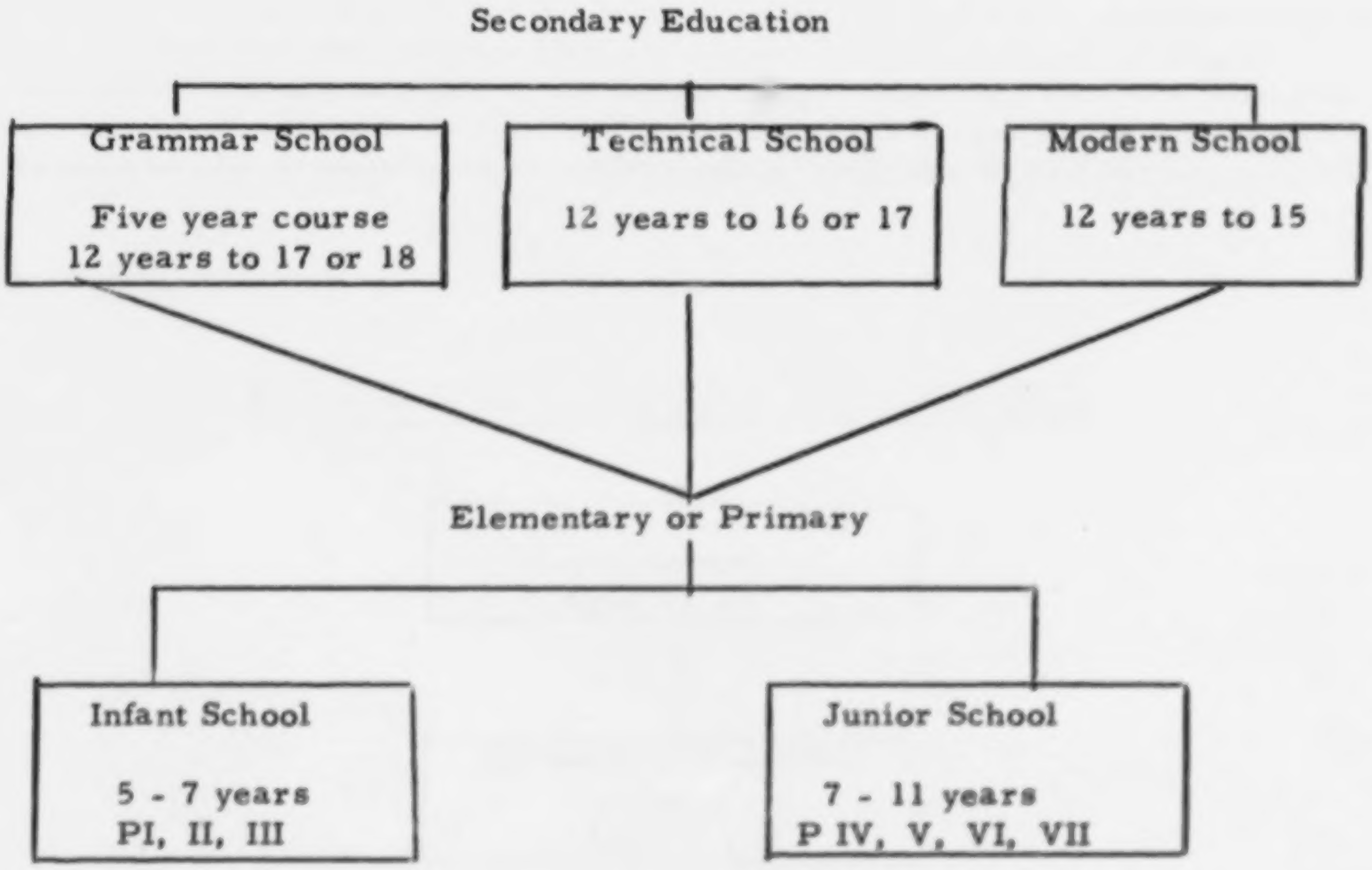

Ministry of Education
County Council
Voluntary Managers
Education Committee
Health and Welfare Committee
Director of Education
County Medical Officer
County Dental Officers
County Welfare Officers
Education Welfare Officers
School Psychological Service
School Medical Service
School Dental Service
Welfare Services
Schools
Teachers
Pupils
Schools
Teachers
Pupils

B. Broad Organizational Structures of Education

Elementary education is commonly understood as the first six grades in the United States. In Great Britain elementary education is most frequently organized for age groups six through eleven and labeled P II - P VII (Primary two through primary seven). In this study elementary education refers to these designated levels of education. Secondary education refers to schooling which occurs after the first six years of formal schooling up to the approximate age of eighteen. In Great Britain elementary education is organized into infant schools (ages five through seven), and junior schools (ages seven to eleven). Secondary education consists of grammar schools, modern schools and technical schools. This structure of organization may be noted in Figure 5.

Figure 5.

Organizational Structure For Education in The United Kingdom


Secondary Education
Grammar School
Five year course
12 years to 17 or 18
Technical School
12 years to 16 or 17
Modern School
12 years to 15
Elementary or Primary
Infant School
5 - 7 years
PI, II, III
Junior School
7 - 11 years
P IV, V, VI, VII

In Great Britain, as in the United States, all pupils follow the same academic pattern in the infant and junior schools. However, provisions are made in many schools for the equivalent of American homogeneous grouping through the practice referred to as streaming - placing students in "tracks" according to their academic ability and achievement.

The grammar school has a largely academic curriculum. "Secondary Modern" schools give a general practical non-academic type of education to children up to and occasionally beyond the school leaving age (fifteen). The curriculum of the technical school in later years is related to industrial, commercial, or agricultural occupations.

In the United States there are commonly two patterns of educational organization: the eight-four plan, and the six-three-three plan. The eight-four plan is composed of eight years in the elementary school, beginning with age six, followed by four years at a comprehensive high school. (See Figure 6). The six-three-three plan consists of six years in an elementary school, followed by three years in a junior high school, and concluded by three years at the comprehensive secondary school. (See Figure 7). In the junior high school pupils follow a prescribed curriculum primarily, but are allowed to make some choices for elective subjects. A comprehensive secondary school contains courses of study for all types of students: academic (college preparatory); vocational and commercial; and general. Technical or vocational secondary schools do exist in the United States; however, they are most frequently found within the educational systems of the larger cities and cannot be said to be characteristic of secondary education in the United States.

Figure 6.

Education in the United States (Eight-Four Plan)

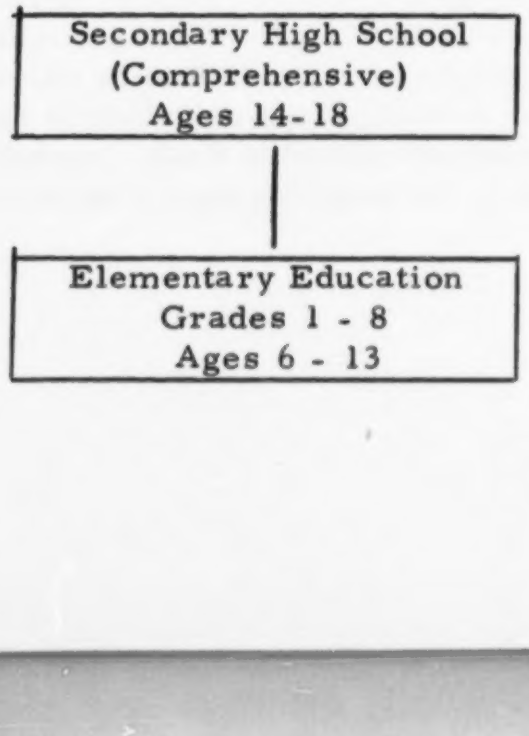
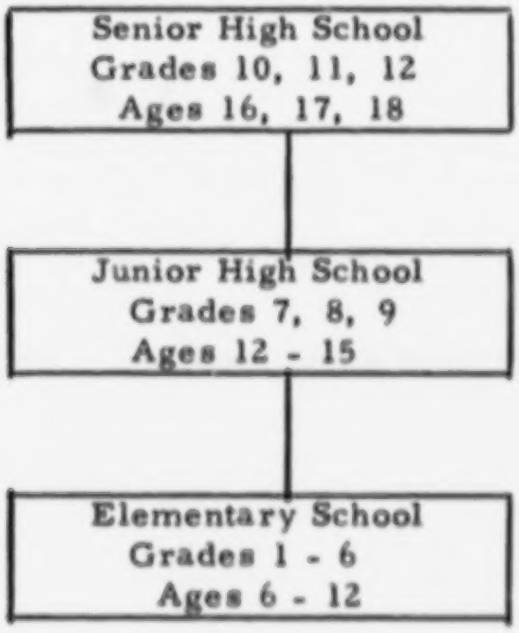


Figure 7.

Education in the United States
(Six-Three-Three Plan)


Senior High School
Grades 10, 11, 12
Ages 16, 17, 18
Junior High School
Grades 7, 8, 9
Ages 12 - 15
Elementary School
Grades 1 - 6
Ages 6 - 12

The broad general administrative structure of education previously described refers to public or tax supported education in the countries concerned. However, the organizational structure for education as indicated in figures seven through nine would, in the main, be equally appropriate for both tax-supported and privately supported educational systems. Perhaps it should also be pointed out that the term "maintained school" in Great Britain is synonomous to the term "public" in the United States. In the United Kingdom such a school is maintained by the Local Education Authority. "Maintenance" includes salaries of teachers, teaching equipment, heating, lighting, etcetera. "Independent schools" in the British Isles are similar to the private schools of the United States. Such schools are not in receipt of grants from the Ministry of Education or a Local Education Authority.

CHAPTER IV. PROCEDURES FOR THE STUDY

A. Administrative

Initially the Ministries of Education in England and Wales, Scotland, and Northern Ireland were contacted and informed of the objectives of the proposed project. In England and Wales and Scotland the project director was immediately referred to the National Foundation for Educational Research in England and Wales and the Scottish Council for Research in Education. The National Foundation for Educational Research in England and Wales has a corporate membership of L. E. A. 's, (Local Education Authorities) university institutes of education, national associations of teachers and other educational bodies. Its income is derived from members' subscriptions and a direct grant from the Ministry of Education and Science. The primary object of the Foundation in England and Wales is to conduct research through its own staff working in conjunction with the Ministry of Education and Science and its officers, with Local Education Authorities, and the universities and teachers. It is also designed to act as a liaison body with any international organization for research in education, as an advisory body at the service of the Ministry of Education and Science, and the L. E. A. 's, and as a center for the interchange of ideas concerning educational research. Its work is complementary to that of the universities, and is concerned with both large-scale and highly specialized inquiries. It also develops and publishes educational tests and publishes books and research reports.

The Scottish Council for Research in Education is controlled by a composite body representing the Educational Institute of Scotland, associations of education authorities, teachers and training colleges, and universities and other organizations interested in education. It is financed by a grant from the Scottish Education Department and by contributions from the Educational Institute and the Education Authorities. The Council has conducted investigations and published the results on numerous educational problems, and, in addition to the full research reports, shorter bulletins for the benefit of the practicing teacher are issued.[1] (It may be of interest to readers to note that a Council for Research in Education in Northern Ireland has since been established). These organizations, having expressed their interest in the proposed project were, therefore, available for immediate consultation and cooperation with the initiation of the project in July, 1963.

The director of the project, in cooperation with designated representatives from the previously indicated national organizations, sought to first of all identify the participating school systems in the British Isles. It was the opinion of the project staff and consultants that community matchings could be expedited by initially selecting the participating communities in Scotland, England and Northern Ireland. Also, there was some urgency in contacting these systems at the earliest opportunity in view of the earlier starting date for the academic year in most of the British Isles. Further, the lack of familiarity with psychological testing procedures and, in fact the American instruments themselves, necessitated more time for advanced preparation.

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[1] Great Britain, British Information Services, Reference Division, I. D. 606 (Revised), August, 1960, Education in Great Britain: An Outline of the Educational System, p. 37.

The participating school systems named were the counties of Down in Northern Ireland, Fife in Scotland and Buckinghamshire in England. A total of 15 communities were selected from these three counties. (For details on selection, see Section B, following). The enthusiastic and generous cooperation and assistance of the educational authorities at all levels in the British Isles aided greatly in expediting the arrangements at this point. The value of meeting personally with such representatives, rather than seeking to handle such through correspondence cannot be overestimated. The selected British communities were analyzed on the basis of such characteristics as a) population; b) industry; c) government; d) relationship to other communities; and e) geographic.

At this point 48 United States communities were selected with at least three communities of near similar characteristics for each of the participating British communities. These communities were selected from a seven-state area. Thirteen schools, both private and public, from 12 communities were randomly selected, which provided a population for later random sampling of approximately the same number as in the British sample. At this point county administrative officers were contacted, appraised of the objectives and characteristics of the study and their participation solicited. Where necessary, alternate selections were made. The local school administrators (principals), were, after county or unit approval next contacted and their cooperation sought. In each instance this was readily given. The participating American communities and schools are also noted in Section B which follows.

B. Community Selection

The age-grade samples for the study were chosen from a spread of communities selected on the basis of such characteristics as population, industrial characteristics of the community, governmental characteristics, relationship to other communities, and various geographic characteristics.

What follows is a brief description of each of the paired communities. Several commonalities will be obvious from these descriptions but wherever necessary other common attributes or pertinent information will be made following the two descriptions.

IRISH AND AMERICAN COMMUNITIES

Bangor, Northern Ireland and Sandusky, Ohio (USA)

Bangor, Northern Ireland is a municipal borough with a population of over 20,000. It is located in the Northeast corner of County Down, Northern Ireland on the South coast of Belfast Lough, near its mouth on the Irish Sea, 12 miles east Northeast of Belfast. It is a seaport and a popular seaside resort, a yachting center, and the scene of annual regatta. There are three piers which form an artificial harbor.

Sandusky, Ohio (USA) is a city of about 29,000, capital of Erie County, Northern Ohio, 50 miles West of Cleveland, on the harbor in Sandusky Bay of Lake Erie. It is both an industrial and a resort city being a shipping point for coal, and a port of entry. There is some manufacturing of paper products, communications equipment, electrical appliances, clay products, crayons, fertilizer, machinery, boats, and novelties. There are also fisheries and wineries. Nearby are Blue Hole Spring (6 miles), Crystal Rock Caves, the Marblehead Peninsula, Cedar Point (summer resort), and many small islands.

It will be noted that both are towns located on the water, are essentially resort areas, and are in the same size category (20,000-30,000).

Newry, Northern Ireland and Meadville, Pennsylvania (USA)

Newry is an urban district with a population of about 15,000. It is located in the Southwestern part of County Down, Northern Ireland, on the Newry River and on Newry Canal, 33 miles South Southwest of Belfast. It is a seaport but produces cattle feed, has linen milling, and engages in tobacco processing.

Meadville, Pennsylvania (USA) is an industrial city of about 18,000. It is the capital of Crawford County in Northwestern Pennsylvania, 33 miles South of Erie and on French Creek. It is also an agricultural trading center but manufactures slide fasteners, rayon, and metal products.

As may be noted, these two communities are essentially industrial communities and are in the same population category (10,000 - 20,000).

Ballynahinch, Northern Ireland and Leetonia, Ohio (USA)

Ballynahinch is a small town of around 2,000 located in central County Down, Northern Ireland, 13 miles South of Belfast. It has some iron mining, is an agricultural market (flax, oats), and has medicinal springs.

Leetonia, Ohio (USA) like Ballynahinch is a small village of slightly over 2,000, located in Columbiana County, East Ohio, 15 miles South of Youngstown. It has some coal mining, manufactures some machinery and tools and produces pretzels.

ENGLISH AND AMERICAN COMMUNITIES

Aylesbury, Buckinghamshire, England and Perrysburg, Ohio (USA)

Aylesbury is an ancient and historical municipal borough of about 20,000, the capital of Buckinghamshire County, England, in the center of the county, 35 miles Northwest of London. It is the agricultural market for upper Thames River valley, with a variety of small dairy-products industry, flour mills, and, nearby, silica-sand quarries.

Perrysburg, Ohio is also a historical village with a population of around 5,000 located in Wood County in Northwestern Ohio. It is a suburb of the large city of Toledo, across the Maumee River from the Southwest outskirts of Toledo. It has a variety of small industries such as metal stampings, furniture, and meat and dairy products.

Although population differences between these two paired communities is somewhat larger than the others, nevertheless they are quite similar in the makeup of the community and the influence of a nearby city. Also the participating schools were approximately the same in size, faculty number, and physical plant characteristics.

Beaconsfield, Buckinghamshire, England and Lyncourt, New York (USA)

Beaconsfield is a residential urban district of about 8,000 residents in South Buckinghamshire, England, 5 miles East Southeast of High Wycombe.

Lyncourt, New York is a residential urban district located on the outskirts of Syracuse, New York. It has a population of around 7,000.

Buckingham, England and Falls View, West Virginia (USA)

Buckingham is a municipal borough of over 3,000 residents located in Northwest Buckingham, England on the Ouse River and 15 miles Northwest of Aylesbury. It is essentially an agricultural market.

Falls View, West Virginia is a village adjacent to Charlton Heights, Fayette County, South central West Virginia on Kanawha River and 25 miles Southeast of Charleston. It has a population of nearly 2,000.

High Wycombe and Chesham Bois (England), and Gross Point, Michigan (USA)

High Wycombe is (officially Chepping Wycombe) a large municipal borough in South Buckingham, England, on the Wye River and located 13 miles South Southeast of Aylesbury, 28 miles West Northwest of London. It is a lumber and furniture center, producing also shoes, agricultural machinery, electrical instruments, and paper. In municipal borough are towns of Wycombe Marsh (Southeast), with paper mills, and West Wycombe (Northwest; population 3, 304).

Chesham Bois is a residential town and parish of around 3, 000 in Southeast Buckingham, England, just South of Chesham.

Gross Point, Michigan is a small city in Wayne County, Southeast Michigan, 9 miles Northeast of downtown Detroit on Lake St. Clair. It has around 6, 000 residents. It is a residential suburb.

The essential feature of these communities was that each had in it a private school drawing from comparable populations.

SCOTTISH AND AMERICAN COMMUNITIES

Leuchars, Scotland and Gassaway, West Virginia (USA)

Leuchars is a town and parish of around 3, 000 located in Northeast Fifeshire, Scotland, near Eden River estuary, 5 miles Northwest of St. Andrews. It is an agricultural market but also has a papermill industry nearby. An R. A. F. station supplies a considerable proportion of the school population, many of them English.

Gassaway, West Virginia is a town of nearly 2, 000 in Braxton County, central West Virginia on Elk River and 4 miles West of Sutton. It is located in an agricultural area.

Leven, Scotland and Catawba, Ohio (USA)

Leven is a burgh of around 8, 000 in East Fifeshire, Scotland, on the Firth of Forth at the mouth of Leven River, 19 miles North Northeast of Edinburgh. It is a coal shipping port and seaside resort, with steel and paper mills, metallurgical, chemical engineering works. Tourism is one of its principal industries. The school used (Parkhill) serves an older part of the Burgh.

Catawba, Ohio is a small village of less than 1,000 in Clark County, West central Ohio, 11 miles East Northeast of Springfield in agricultural area and a lakeside resort.

Anstruther, Scotland and Glenville, West Virginia (USA)

Anstruther is a village in East Fifeshire, Scotland, on the Firth of Forth near its entrance on North Sea, 8 miles Southeast of St. Andrews. Composed of Anstruther Easter and Anstruther Wester which, together with adjacent Kilrenny, form a single burgh of about 3,000. It is a fishing port and seaside resort. The hinterland is predominantly agricultural.

Glenville, West Virginia is a small town of about 2,000, capital of Gilmer County, central West Virginia on the little Kanawha 21 miles West Southwest of Weston. It is in an agricultural region but also has glass manufacturing and lumber milling.

Rosyth, Scotland and Lyncourt, New York (USA)

Rosyth is a small town in Inverkeitling parish, Southwest Fifeshire, Scotland, on the Firth of Forth, just Northwest of Inverkeitling. It has a naval base. Population is unknown. The school used was St. John's Primary, a Roman Catholic School. The community is dependent upon the Royal Naval Dockyard at Rosyth. It has a shifting population with a heavy proportion of English pupils.

Lyncourt, New York is a residential urban district located on the outskirts of Syracuse, New York. It has a population of around 7,000. The school used was St. Daniel's.

Glenrothes, Scotland and Oregon, Ohio (USA)

Glenrothes is a new town with an incoming population that is predominantly young. The main industries in Glenrothes are mining and light engineering. No stable population figure is available but the town is expected to increase in size to over 50,000 with further industrial development.

Oregon is a new, small city adjacent to Toledo, Ohio located on Lake Erie. Its population is over 10,000 and its main industry is oil refraction and fishing. Here again, the participating schools were quite similar in size, number of faculty, and physical plant.

St. Andrews, Scotland and Maumee, Ohio (USA)

St. Andrews is a burgh of around 10,000 in Fife County, East Scotland on the North Sea. It is a summer resort famous for its golf courses. The school there, the only fee-paying primary school under the Fife Education Committee, draws from a somewhat exclusive residential character.

Maumee, Ohio is a residential village of around 12,000 in Northwestern Ohio on the Maumee River just southwest of Toledo. The school chosen there is a fee-paying private one which draws from exclusive residents in the general area of Northwest Ohio.

Dysart, Scotland and Perrysburg, Ohio (USA)

Dysart is an ancient settlement which now is part of Kirkcaldy. Its population is unknown and is undergoing extensive re-development. It is located in South Fifeshire, Scotland, on the Firth of Forth, just Northeast of Kirkcaldy. It is a coal-shipping port, with coal mining and linen milling.

The community of Perrysburg has been discussed earlier in this chapter. (p. 27).

Cardenden, Scotland and Lyncourt, New York (USA)

Cardenden is an industrial suburb and parish--population around 14,000--in Northeast Stirlingshire, Scotland, just South of Stirling. It is located in the heart of a mining community with a predominantly working class of people. The school used was a Roman Catholic one.

Lyncourt, New York is a residential urban district located on the outskirts of Syracuse, New York. It has a population of around 7,000.

C. Instrument Selection

The experimental design necessitated the selection of standardized tests to measure academic potential and academic achievement. A major consideration was the selection of evaluative instruments that could be used in a cross-cultural study of this nature. The following considerations influenced the examination and final selection of the test batteries: (a) subject matter areas covered (b) reliability and validity factors (c) range of grades included in the test batteries (d) cultural fairness of the test items in the subject matter areas (e) number of alternate forms available for successive testing programs (f) ease of test administration, and (g) ease of scoring.

After reviewing the literature discussing the standardized tests currently being used in the United States and consulting with representatives from various test companies, a selected sample of achievement and ability tests were examined by the project staff. The final instruments selected by the staff were the California Achievement Test battery and the Otis (short form) Ability Test.

(1) The California Achievement Test Battery

In terms of the previously mentioned criteria, the California Achievement Test seemed to be especially suitable for this study.

Subject matter areas covered -- six achievement variables are assessed in the California Battery. These variable comprise three major areas: reading, arithmetic, and language, divided into six sub-tests as follows:

1.	Reading Vocabulary	Total Reading
2.	Reading Comprehension	
3.	Arithmetic Reasoning	Total Arithmetic
4.	Arithmetic Fundamentals	
5.	Mechanics of English	Total Language
6.	Spelling	

These same six variables are evaluated at all levels of the California Achievement series thus facilitating comparisons between grade levels.

Reliability - Reliability coefficients were computed using Kudar-Richardson formula 21 on the six principle subtests of the California Achievement Tests. A coefficient of reliability of 0.97 (for all levels) results when the coefficients of the six tests are applied to the formula $r_{6c} = \frac{6\bar{r}}{1 + 5\bar{r}}$ where $\bar{r}$ = average reliability for the six tests equally weighted. The standard error of a measurement is also given for each of the six variables in the different levels of the achievement battery.

Validity - The California Test Company has conducted research concerning the validity of their achievement battery, under two major headings (1) content validity and (2) construct validity.

(a) Content Validity - the discriminating power of each item was determined for each grade by subtracting the percent of correct responses of the bottom twenty-seven percent of the pupils from the percent of correct responses of the top twenty-seven percent. The average difficulty was obtained by determining the percent of pupils in each grade that responded correctly to each item and then computing the average of the grade. An attempt was made to cover a broad sampling of content in each test. Over-all discrimination indices of the various batteries are expressed as phi coefficients and presented in the manual.

(c) Construct Validity - The California manual[2] reports validity studies between the California Achievement Tests and other standardized achievement instruments. Each of the subtests are compared to similar tests in other recognized batteries. An example of the relationship of the subtests of the elementary California battery with other standardized tests are correlation coefficients between the arithmetic reasoning section, California Lower Primary Battery and the Metropolitan Numbers Tests and the Stanford Arithmetic Reasoning of .71 and .79 respectively.

Range of grades included in the test batteries - The California test battery consists of five levels beginning with the first grade and going through the twelfth grade. The six variables previously mentioned may be found in each of the five levels. This not only permitted intergrade comparisons but also allowed for an adequate range of difficulty level and anticipated further comparisons at higher grade levels. The California was one of the few batteries that examined the same general achievement variables in grades one through twelve.

Cultural fairness of the test - The project staff realized that a number of items in the test batteries would have to be eliminated because of cultural bias. In their examination of recognized achievement batteries it was found that the California had fewer items dealing with the monitary system, weights and measures, time, and geographic locations than the other achievement batteries. Although a few items were eliminated in the arithmetic subtests at each level the eliminations were less than would have occurred in other batteries. The Cronbach alpha internal consistency test established reliability coefficients for these arithmetic subtests after the elimination of the biased items at each grade level respectively.

Following are the reliability coefficients:

Grade	Reasoning	Fundamentals
1	.83	No items eliminated
2	.85	No items eliminated
3	.62	No items eliminated
4	.77	.93
5	.75	.90
6	.81	.89

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[2] Tiegs, Ernest W., and Clark, Willis W., Manual, California Achievement Tests Complete Battery, Lower Primary, California Test Bureau, Monterey, California, 1957. p. 12.

Number of alternate forms - Since the achievement tests were to be administered three times during the academic year, the availability of alternate forms was also an important consideration in test selection. Appropriate alternate forms were available in the California Achievement Series. Two forms were used for the primary level and three alternate forms for the other levels. (Forms Y and Z were not available for the primary level at the time of the study).

(2) Otis Quick Scoring Mental Ability Tests

The Otis Mental Ability Tests were selected as the instruments for obtaining measures of academic ability for the classifying of the pupil population of the study into high, average, and below average ability groupings. These catagories were defined as follows: I.Q. score of 110 and above, high ability catagory; 90 to 109, average catagory; and below 90, below average ability.

The Otis series was selected as most appropriate on the basis of established validity and reliability, series extending from grades 1 thru college, availability of alternate forms, and suitability for such an international study. The Otis Alpha Test was administered to pupils in grades 1 thru 3 and the Otis Beta Test to grades 4 thru 9.

The Otis series establishes validity on the basis of estimating ability to handle school work successfully. An example of the degree of validity established in this context is a correlation between the Alpha short form and the Reading subtests of the Metropolitan Achievement Tests for two samples of .63 and .62; the arithmetic reasoning subtests of the Stanford Achievement tests of .51, .60, and .52 at grades 1, 2, and 3 respectively; and, with the paragraph meaning tests of the same series, .31, .56, and .56 at grades 1, 2, and 3 respectively.[3] The Otis Beta Series show correlations ranging from .564 (arithmetic computation) to .827 (word meaning) on the nine sub-tests of the Stanford Achievement Tests, Form J., for 5th grade pupils.[4]

The reliability of a test is defined as the consistency with which the test measures whatever it does measure. Split-half reliability coefficients reported for the Otis Alpha, for two samples were .87 and .88. The Otis Beta reported coefficients of the correlation between forms A and B of the tests, for grades 4 to 9 combined as .96.

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[3] Otis, Arthur H., Otis Quick Scoring Mental Abilities Test: New Addition, Manual of Directions, Alpha Short Form, Harcourt Brace and World Inc., New York, N. Y.

[4] Otis, Arthur H., Otis Quick Scoring Mental Abilities Test: New Addition, Manual of Directions for Beta Test, Harcourt Brace and World Inc., New York, N. Y.

With the assistance of school personnel and consultants in the British Isles the following tests of The National Foundation for Educational Research in England and Wales were also utilized in the study. The title of each instrument, its reliability, and brief descriptions are all reported from the publication of the foundation entitled Educational Guidance in Schools.[5]

(3) English Progress Tests, A thru F

A series of six tests designed to provide a continuous assessment of English skill from ages 8 thru 14. Forms A (8 - 9 yrs.), B (9 - 10 yrs.), C (10 - 11 yrs.), and D (11 - 12 yrs.) were administered during the project. Reliability coefficients for forms A thru D were reported as .96, .97, .958, and .95 respectively.

(4) Arithmetic Progress Tests, Forms A1, B1 and B2, C1 and C2.

These tests were designed to estimate arithmetic attainment of pupils in the second (Form A1), third (Forms B1 and B2), and final two years (Forms C1 and C2) of the English primary school. They are recommended for the age range from approximately 8-1/2 to 11-1/2 years. Reliability for form A1 is stated as .96, for forms B1 and B2 and .97 and for forms C1 and C2 as .965.

(5) Sentence Reading Test

This test is designed as a test of reading comprehension for the age range of 7-1/2 to 11 years. It consists of 35 items, graded in difficulty, of the incomplete sentence type. The reliability of the test is .94 (test-retest) SE_m (average value) 3.6 points.

D. Administering the Testing Program

As specified by the design of the study, three distinct testing periods were established: beginning, mid-term, and ending of academic year. The first period for the American schools was the last two weeks of September and the first ten days of October. Since the British academic year begins earlier than that of the American schools, the period set aside for the first testing in Great Britain was the last ten days in August and the first two weeks in September.

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[5] National Foundation For Educational Research in England and Wales, Educational Guidance in Schools, Newnes Educational Publishing Co. Ltd., 1962, London, England.

During the first testing period appropriate levels of the Otis Mental Ability and California Achievement Tests (English usage, arithmetic, reading) were administered to all students comprising the sample. Uniform administration of the tests for all three testing periods was obtained by having a member of the project staff personally visit each school on the day preceding the administration and reviewing the administrative procedures with the teachers of all classes participating in the study, who then administered the tests to their own classes the following day. The research staff member remained in the school during the testing to assist in the event of unanticipated questions or difficulties and to observe the test administration procedures. The system worked very smoothly and no major test administration problems arose.

The design of the study stipulated that the second administration of the achievement tests occur near the mid-point of the academic year. Several factors had to be considered before establishing mid-year testing dates: a) British schools begin earlier and end their academic year later than the American schools; b) the British academic vacation periods are of different lengths and occur at different dates than those of the American schools. Therefore, the dates of mid-year testing periods varied according to each individual situation. The American schools mid-year tests were administered between February 10 and 21; the British mid-year tests were administered between February 17 and March 10. During the second testing period, all students in the sample were given appropriate levels of the California Achievement Test battery (English usage, arithmetic and reading). A randomly selected sample of classes from each country was also administered the standardized British achievement tests in Sentence Reading, Arithmetic Progress, and English Progress.

The final testing period for the United States schools was May 11 through May 26; for the British schools it was May 25 through June 10.

E. Statistical Methods

The purpose of this study was to analyze and compare the results of United States and British Isles pupils' achievement in the areas of arithmetic, reading, and English usage. Interest in achievement was specifically directed to pupils located in private and public schools of grades one and two, and three to six. Of further interest was the achievement of pupils according to ability level differentiation. In order to analyze simultaneously the organization of variables of grade and country and ability, the analysis of variance was used as the statistical method to assess differences in mean achievements that were present at the first testing period, fall, 1963. Such an analysis answers the question of whether or not differences exist in mean achievement for U. S. and British Isles pupils of differing ability levels and at various grade levels.

In the analysis of variance (ANOVA) the organizational categories of grade and country and ability are termed factors of the analysis and are referred to as main effects (these main effects are the independent variables; the dependent variables are the resultant achievement raw score means on the variables of reading-vocabulary and comprehension; arithmetic-reasoning and fundamentals; and English usage-mechanics of English and spelling.) In order to interpret the main effects clearly in the analysis of variance design the interactions of these main effects must be taken into consideration. The analysis of variance, then was employed to determine whether obtained differences between means could be expected beyond chance level. The actual significance test obtained from the analysis of variance is called an F-Ratio.

In order to assist the reader in interpreting the results of this study a fictitious set of means and corresponding analysis of variance table are presented. Table 1 presents the general design of the study. The organizational factors are grade, ability, and country (independent variables); the raw score means obtained are on the variables of reading, arithmetic, and English usage - the dependent variables. This study will present four such organizational structures, one as seen in Table 1 for public school and separately for private school for grades 1 and 2 and grades three to six. Table 2 presents the fictitious means on the variable of reading vocabulary for pupils who might be enrolled in grades one and two and who could be said to be located in public schools. Table 2 then is like the organizational design of this study as noted in Table 1. The means that are contained in Table 2 are termed cell means. Inspection of Table 2 would indicate that U. S. pupils of high and average ability, grade one, obtained lower means than British Isles pupils of high and average ability first grade. The reader should note that at second grade, however, for the fictitious means, the U. S. high and average ability pupils obtained a higher mean than British Isles pupils of high and average ability. Inspection of these cell means, however, does not offer the reader the opportunity to know whether or not these differences in mean performance were statistically significant.

Table 1

Design of a 2 x 2 x 2 Factorial ANOVA of Grade by Country by Ability Level

Grade	Ability	U. S.	B. I.	
1	High	$\bar{X}_1$	$\bar{X}_2$	Dependent variable means
	Average	$\bar{X}_3$	$\bar{X}_4$	
2	High	$\bar{X}_5$	$\bar{X}_6$	
	Average	$\bar{X}_7$	$\bar{X}_8$	

Table 2
Cell Means (fictitious) for Reading Vocabulary, Grades 1 - 2, Public School

Grade	Ability	U. S.	B. I.
1	High	10.2	19.3
	Average	4.1	7.1
2	High	25.4	15.6
	Average	12.3	9.4

In order to so determine significance the reader would need to turn to Tabld 3 which contains the fictitious F-ratios of main effects (grade and country and ability--the independent variables) and interactions of these main effects in the factorial two-by-two-by-two analysis of variance (ANOVA) for the variable of reading vocabulary for the fictitious pupils located in grades one and two public schools. Examination of Table 3 indicates that four pieces of information are presented: (1) the source of variation which is the listing of the main effects and interactions of those main effects; (2) the degrees of freedom; (3) and the specific F-ratio for the listed variable; and (4) the indication as to whether the obtained F-ratio was significant at the .05 or .01 levels. In the analysis of variance with equal groups in each cell, that is the same number of first and second grade pupils of high and average ability in both the U. S. and British Isles, interpretation of the F-ratio can be made directly to the obtained cell means. However, in this study the numbers of students in each category were not equal. Therefore, the reader is not able to merely average across the cell means and obtain the main effect mean because of the unequal weighting in varied cells due to the unequal numbers represented within them. The main effect means for this study are tabled in the appendix.

Let us return to the fictitious data as presented in Tables 2 and 3. Inspection of Table 3 would indicate that a significant F-ratio was obtained on the main effect of grade, 90.21 being the F-ratio which was significant, as noted by the double asterisk, at the .01 level. This is to be interpreted as indicating that the probability of obtaining such a relationship by chance was less than one time in a hundred, indicating statistical significance for the main effect of grade. Now in order to determine which of the two grades was significantly different than the other, one needs to have presented the main effect means. In this fictitious case let us assume that the fictitious means were: first grade main effect mean, 9.3; and second grade main effect mean, 15.3 thereby inspection would indicate that second grade pupils obtained a significantly higher gain than did first grade pupils. (Recall these main effect means are tabled in the appendix), and recall that it is not appropriate to merely take the mean of the cell means as a main effect mean because of the unequal numbers wherein in order to determine

Table 3

F-Ratios (fictitious) of Main Effects and Interactions Factorial, 2 x 2 x 2, Analysis of Variance (ANOVA) on Reading Vocabulary, Grades 1 - 2, Public Schools

Source of Variation	Degrees of Freedom	Reading Vocabulary
Grade	1	90.21**
Country	1	2.13
Ability	1	22.21**
Grade & Country	1	5.25*
Grade & Ability	1	----[1]
Country & Ability	1	----
Grade & Country & Ability	1	----
Within	112	

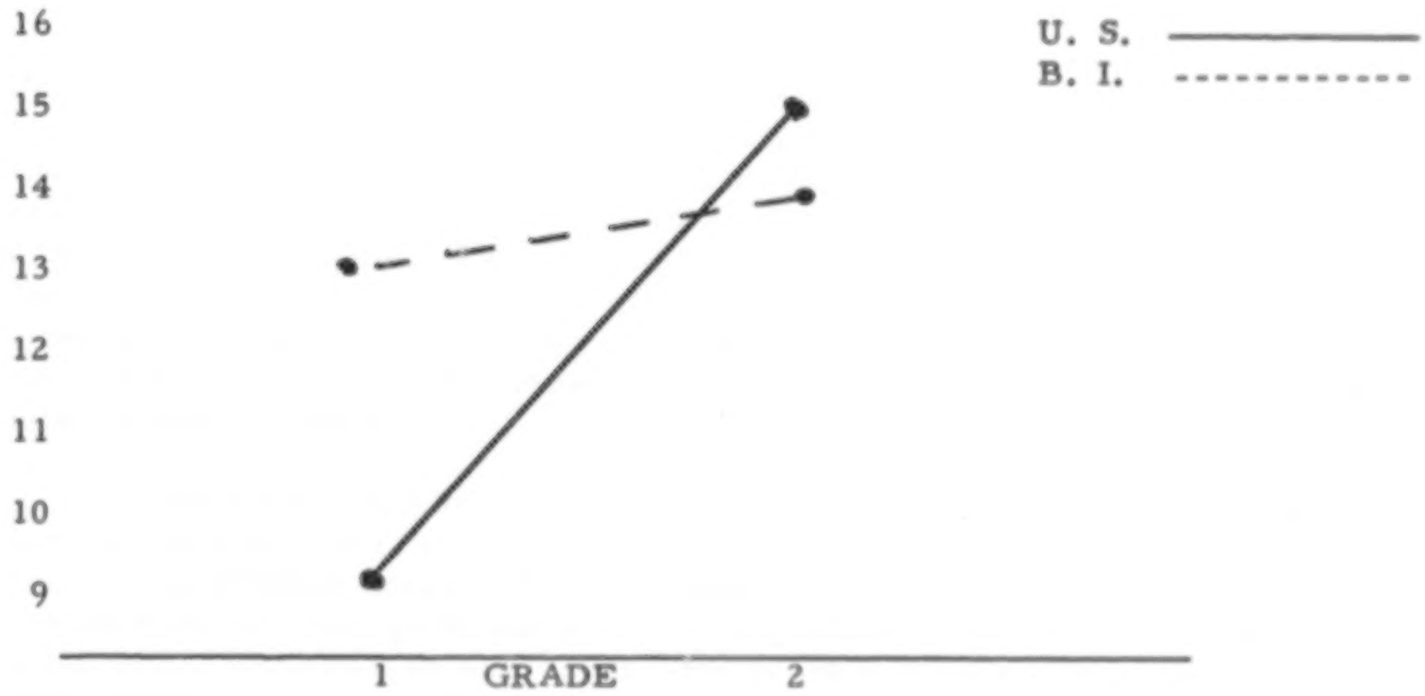
* p L.05

** p L.01

[1] Note: all blanks refer to F-ratios less than 1.

the main effect mean for the cells one would have to weigh the means according to the number of students in each cell to determine the main effect mean. Continued inspection of Table 3 would indicate that the main effect for country was not statistically significant, the F-ratio being 2.13 (note that the significance of the F-ratios is determined by reference to a table of F-ratios). For this fictitious set of data the main effect of ability, as noted in Table 3 was significant, the F-ratio being 22.21. Assuming that the main effect means for ability were: high ability, 18.1; and low ability, 8.1, we would see that the high ability pupils obtained a significantly higher mean than the low ability pupils. The reader would note by examination of Table 3 that the grade by country interaction was significant, the F-ratio being 5.25. The presence of this grade by country significant interaction means that caution must be used in interpreting the main effects whereever interaction occurs for those respective main effects; namely, that one would need to carefully look at the main effects of grade and country in this example -- recall that the grade main effect was significant but the country main effect was not (the main effect means for country were: U.S., 12.2; and British Isles, 12.8). Figure 8 is presented to aid the reader in interpreting the significant interaction of grade by country.

Figure 8
Interaction of Means (fictitious) For Reading Vocabulary By Grade and Country



Note that the interaction undoubtedly occurred because of the cross-over of means: first grade U. S. mean was 9.9 and British Isles 13.2 wherein the British Isles mean was higher, however, the means "crossed over" at second grade with the U. S. mean (15.7) being higher than the British Isles mean (14.1). Cochran (1957) noted, "When interactions are large much care is required in the preparation of a statement that summarizes the results, and it is not easy to reach a form that is free from criticism." Cox (1958) indicated, "Interactions are most commonly dealt with by describing how the effect of the treatment factor varies from one level to another of the classification factor." Whenever an absence of an interaction occurs such absence allows a more meaningful interpretation of the main effects. Thus, the reader throughout the result section should exercise caution in interpreting the main effects whenever significant interactions are present. Inspection of Table 3 will reveal that no other interactions were significant. In thus study no attempt will be made to interpret the second order interactions; namely, interactions of grade by country by ability. The summary for the fictitious data then as reported in Tables 2 and 3 would be that second grade pupils obtained a significantly higher mean than first grade pupils and high ability pupils obtained significantly higher means than low ability pupils; however, this must be interpreted in the perspective that the U. S. first grade means for high and average ability pupils were lower than British Isles pupils, in corresponding categories, but at second grade the U. S. means for high and average ability pupils were higher than the corresponding British Isles means, but a significant difference was not obtained for the main effect of country.

The analysis of variance design was used to analyze the results of the fall testing, 1963. A factorial analysis of covariance was used to analyze the results of the midyear and final testing periods. The analysis of covariance is interpreted in the same way as is the analysis of variance. The reader will have presented for him a means table and an F-ratio table and Figures wherever interactions occur. The analysis of covariance is a statistical control in contrast to an experimental control as in the analysis of variance. The analysis of covariance allows for adjusting the midyear scores to the final test scores, in effect rendering a gains comparison. In the interpretation of the main effects for the analysis of covariance the reader will have presented for him the adjusted main effects. Both the main effect means for the analysis of variance and the adjusted main effect means for the analysis of covariance will appear in table form in the appendix.

The major analyses of this study centered on significance of differences for the main effects of country on the dependent variables of reading, arithmetic, and English usage. The main effects of grade and ability levels of course have psychological and practical significance and were included as independent variables to lend robustness to the analysis of significance for the main effect of country. Specific significance of means for more than two grade levels and two ability levels, while perhaps of interest to some readers, was not tested for specific statistical significance. These significant F-ratios for main effects of more than two grade and two ability levels will therefore be analyzed descriptively.

Population of Study

Over 4,500 pupils participated in the testing program of the study. Absences for one or more of the testing periods, transfers, and withdrawals and invalid tests reduced this number to a population of 4,221 (2,659 U. S. and 1,562 British). From this population, previously stratified by community characteristics, pupils were randomly selected to proportionally represent country, grade level, ability level, and private or public schools. The proportional analysis was employed as being more representative than equal n's and also insured a larger number for the final analysis.

Proportions for ability level, public schools, were based on .40 high, .42 average, and .18 low for grades one and two and .211 high and .789 average for grades three through six. It should be noted that there was not a significant number of public or private school pupils with measured I.Q.'s of under 90 for grades three through six to make a meaningful analysis of this ability level category. This problem, not so unexpectedly, also existed at grades one and two as well as for the private school sample. Proportions for ability levels, private schools, were based on .50 high and .50 average, grades one and two; and .689 high and .311 average, grades three through six.

Proportions for country for public schools were based on .774 U. S. and .226 British, grades one and two; and .684 U. S. and .316 British, grades three through six. Proportions for country for private schools were based on .70 U. S. and .30 British, grades one and two; and .385 U. S. and .615 British, grades three through six.

The total number of pupils involved in the final analysis for each grade level, public schools, were as follows: 689, first grade; 532, second grade; 485, third grade; 419, fourth grade; 403, fifth grade; and 425, sixth grade. The total number of pupils involved for each grade level, private schools, were as follows: 72, first grade; 72, second grade; 74, third grade; 106, fourth grade; 104, fifth grade; and 101, sixth grade. A total of 3,482 pupils (2,953 public and 529 private) were involved in all the analysis.

F. Procedural Time Table

July through August, 1963	Administrative organization for the project; Identifying and contacting participating schools; Organizing and coordinating schedule of testing; orienting participants; Review of procedures.
September	Administering of I.Q. and achievement tests to all students.
October through December	Scoring of tests; Organization and processing of data; Preparation of reports to schools.
January, 1964	Administrative organizing for second testing period.
February	Administering of mid-year achievement tests to all students, grades one through six.
February through April	Scoring of tests; Organizing and processing of data; Preparation of reports for schools. Administrative organization for third testing period.
May - June	Administering of year-end achievement tests to all students.
July through September	Scoring of tests; Organization and Processing of data; Preparation of reports for schools.
October through December	Organization and tabulation of data preliminary to final analysis. Random selection of study population.
January, 1965	Punching of data on cards for computer processing.
February	Computer processing of data; Preparation of interim report.
March	Preparation of first draft of final report.
April - May	Conferences for discussion of findings; Preparation of final report.
June	Distribution of final report to appropriate offices and agencies.

Elapsed time for the project: 23 months: July 1, 1963 through June 1, 1965.

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CHAPTER V. COMPARISONS OF ACADEMIC ACHIEVEMENT

This chapter presents the results of the study of the Cross-cultural Comparison of Achievement of British Isles and United States students in the areas of reading--vocabulary and comprehension; arithmetic-usage and fundamentals; and English usage--mechanics of English and spelling. As indicated previously this section will present tables of means and F-ratios from the analysis of variance and covariance, respectively. The analysis of variance is the statistical technique that was used to analyze the data for the first testing period for the dependent variables of reading-vocabulary, and comprehension; arithmetic-reasoning and fundamentals; and English usage-mechanics of English and spelling. A separate analysis was made for private schools and public schools and grades 1 - 2 and grades 3 - 6. The analysis of variance for the data on the dependent variables for the first testing period was used to answer the null hypothesis concerning no significant difference between means of the British Isles and United States pupils on the dependent variables. The analysis of covariance was used to determine significance of differences that may have accrued for the gain on the dependent variables between the second and the third testing periods. This chapter will, therefore, deal chronologically with the analysis of the results for the private schools grades 1 and 2; private schools grades 3 to 6; then public schools grades 1 and 2; public schools grades 3 to 6 based on the analysis of the first testing results. The second section of this chapter will deal with the analysis of covariance dealing with the results in the same order of presentation; namely, private schools grades 1 and 2; grades 3 to 6; then public schools grades 1 and 2; and separately grades 3 to 6 on the dependent variables of academic achievement.

A. First Testing Period

(1) Private Schools, Grades 1 and 2

Table 4 presents the means for the reading sub-tests of vocabulary and comprehension for pupils of high and average ability in grades 1 and 2 in the private schools in the study. It should be recalled that both the means table and the F-ratio of mean effects and their interactions for the respective variable under consideration should be analyzed simultaneously.

Table 4
Means for Reading, Vocabulary and Comprehension, Grades 1 - 2
First Testing Period, Private Schools

Grade	Ability	Vocabulary U. S.	Vocabulary B. I.	Comprehension U. S.	Comprehension B. I.
1	High	38.5	54.1	1.0	5.7
	Average	29.0	34.0	0.1	1.2
2	High	66.2	63.7	11.0	6.2
	Average	51.9	56.4	10.6	8.2

Inspection of Table 4 indicates that the means for the British Isles first-grade pupils of both high and average ability on the variable of reading vocabulary were higher than the means for the United States students at these respective ability levels and grade level; the means for the second grade high United States pupils were higher than the means for the British Isles pupils. It is necessary to turn to Table 5 to interpret the statistical significance of these means presented in Table 4, or more accurately, Table 5 presents F-ratios for grade and country and ability level and the respective interactions of these mean effects for the variables of reading vocabulary and comprehension. The F-ratio, Table 5, for the mean effect of grade, 131.07, was statistically significant beyond the .01 level. The main effect mean for second grade was 59.3 and for first grade, 36.9, indicating a statistically significant difference favoring the second-grade pupils. Table 5 also indicates a statistically significant F-ratio for the mean effect of country. The British Isles main effect mean for country was 52.1 whereas the United States main effect mean was 46.4, this indicating that the British Isles pupils' means were significantly higher than the U. S. main effect mean on reading vocabulary. The F-ratio for ability level, 40.19, was also statistically significant beyond the .01 level. The main effect mean for high ability was 54.3 and for average ability, 41.9. Therefore, all three main effect means were statistically significant. The second grade statistically higher than first grade, British Isles statistically higher mean than the U. S., and the high ability significantly higher than average ability pupils. Inspection of Table 3 also reveals a statistically significant first order interaction between grade and country. The F-ratio of 4.67 was statistically significant at the .05 level. It should be recalled from the above discussion of main effects and their interactions that whenever a significant interaction occurs the interpretation of the significant mean effects must be made with caution. In order to assist in the interpretation of this significant interaction, Figure 9 presents a graph on the means by grade and country. The interaction undoubtedly has occurred because of the mean differences that existed between the British Isles and the U. S. pupils at

Table 5
F-Ratios of Main Effects and Interactions For Reading, Vocabulary and Comprehension, For Grades 1 - 2, First Testing Period, Private Schools

Source of Variation	Degrees of Freedom	Reading Vocabulary	Reading Comprehension
Grade	1	131.07**	140.17**
Country	1	6.98**	7.41**
Ability Level	1	40.19**	22.98**
Grade & Country	1	4.67*	2.45
Grade & Ability Level	1	------ [1]	2.78
Country & Ability Level	1	------	------
Grade & Country & Ability Level	1	4.26*	4.80*
Within	112		

* $p < .05$
** $p < .01$

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[1] Note: All blanks refer to F-ratios less than 1 for this, and all subsequent tables.

grade one, the difference becoming smaller at the second grade level. Inspection of Table 5 also indicates that a second order interaction was significant beyond the .05 level. It should be recalled from the above discussions on main effects and interactions that no attempt will be made to interpret second-order interactions (grade by country and ability level).

Figure 9
Interaction of Means For Reading Vocabulary by Grade and Country

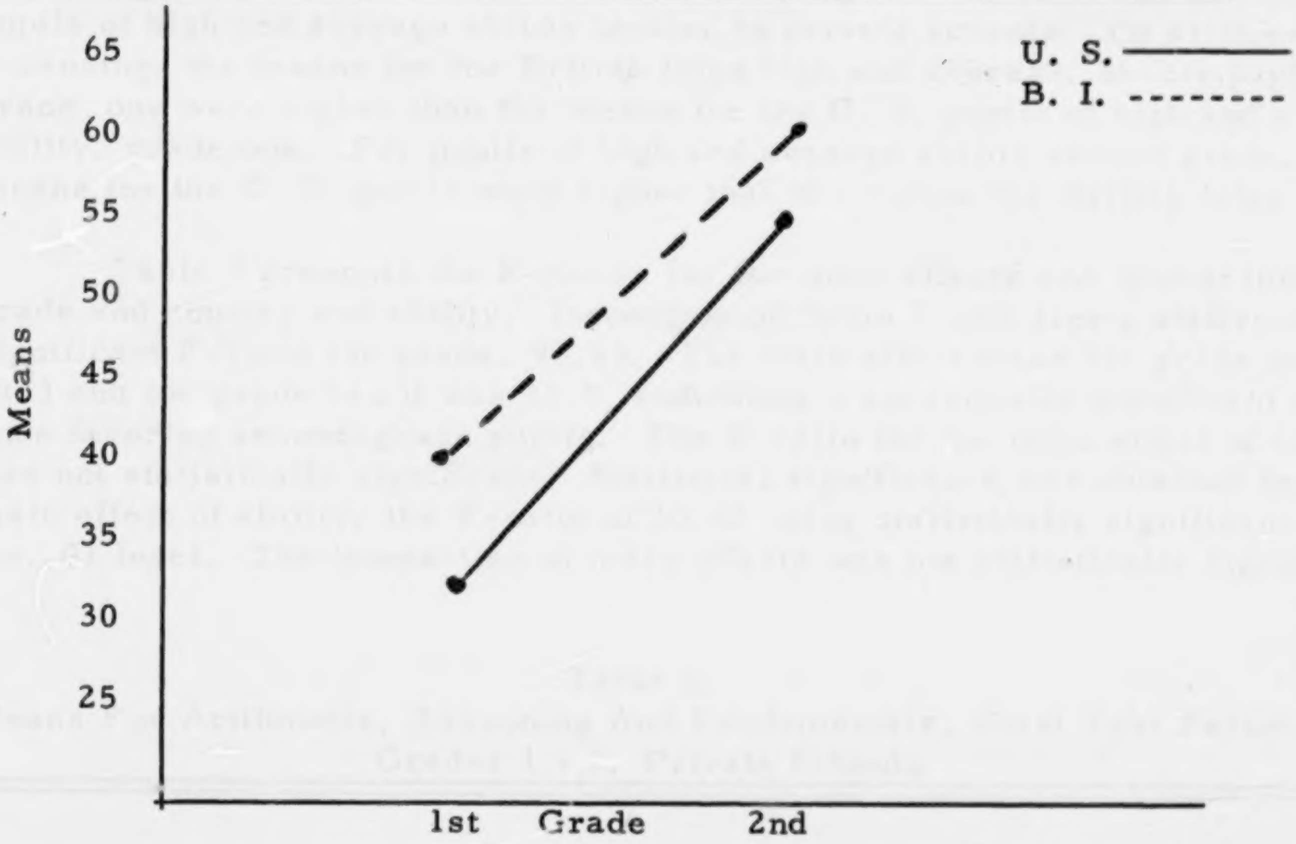


Table 5 also contains the F-ratios for the main effects and interactions for the variable of reading comprehension. The F-ratio of 140.17 for grade was statistically significant beyond the .01 level. The mean for the main effects of grade was 1.4 for grade 1 and 8.8 for grade 2, indicating a statistically significant difference in favor of grade 2. A statistically significant country main effect F-ratio (7.41) was also present. The main effect mean for British Isles was 6.4 and for the United States it was 4.6, indicating a statistically significant difference in favor of British Isles. It should be noted in Table 4 that whereas both high and average ability means in grade 1 for British Isles pupils were higher than for corresponding United States pupils in grade 1, at the second grade level the United States high and average pupils attained the higher mean. The country mean effect was statistically significant, with a higher mean attained for second-grade U. S. pupils, whereas the reverse was true for grade one.

Table 5 indicates a significant F-ratio for ability level, 22.98, statistically significant beyond the .01 level. The respective mean effect for ability levels were: high ability 6.6; and average ability, 3.6, indicating a statistically significant difference in favor of high ability pupils. Second order interactions of grade by country and grade by ability level were not statistically significant.

Table 6 presents the means for the dependent variable of arithmetic--reasoning and fundamentals--on the first testing period, first and second grade pupils of high and average ability located in private schools. On arithmetic reasoning, the means for the British Isles high and average, ability pupils at grade one were higher than the means for the U. S. pupils of high and average ability, grade one. For pupils of high and average ability second grade, the means for the U. S. pupils were higher than the means for British Isles pupils.

Table 7 presents the F-ratios for the main effects and interactions of grade and country and ability. Inspection of Table 7 indicates a statistically significant F-ratio for grade, 97.63. The main effect mean for grade one was 19.3 and for grade two it was 31.9, indicating a statistically significant difference favoring second-grade pupils. The F-ratio for the main effect of country was not statistically significant. Statistical significance was obtained for the main effect of ability, the F-ratio of 30.42 being statistically significant beyond the .01 level. The interaction of main effects was not statistically significant.

Table 6
Means For Arithmetic, Reasoning And Fundamentals, First Test Period, Grades 1 - 2, Private Schools

		Reasoning		Fundamentals	
Grade	Ability	U. S.	B. I.	U. S.	B. I.
1	High	22.1	25.4	20.4	30.6
	Average	15.2	16.1	10.1	27.3
2	High	35.2	34.9	36.6	39.7
	Average	30.2	25.2	30.4	35.4

Table 7
F-Ratios of Main Effects and Interactions For Arithmetic, Reasoning and Fundamentals, First Test Period, Private Schools

Source of Variation	Degrees of Freedom	Arithmetic	
		Reasoning	Fundamentals
Grade	1	97.63**	103.43**
Country	1	-----	29.02**
Ability	1	30.42**	20.85**
Grade & Country	1	2.91	8.57**
Grade & Ability	1	-----	-----
Country & Ability	1	1.60	1.90
Grade & Country & Ability	1	-----	-----
Within	112		

** $p < .01$

Table 6 also contains the means for arithmetic fundamentals for first and second-grade pupils of high and average ability. Inspection of Table 6 indicates that British Isles pupils at both first and second grade and of high and average ability obtained higher means than U. S. pupils in both grades one and two and of high and average ability. Table 7 also presents the F-ratios for arithmetic fundamentals. The F-ratio of 103.43 for the main effect of grade was statistically significant beyond the .01 level. The main effect mean for first grade was 19.4; second grade, 34.7, indicating a statistically significant difference favoring second-grade pupils. The F-ratio for country, 29.02, was also statistically significant beyond the .01 level. The main effect mean for U. S. was 24.4; British Isles, 33.3, indicating a statistically significant difference favoring British Isles. Also significant beyond the .01 level was the F-ratio of 20.85 for ability level. The main effect means for ability were: high, 30.5; average, 23.6; a significant difference favoring high ability pupils.

The interaction of grade by country was also statistically significant. Figure 10 aids in the interpretation of this statistically significant interaction. Observation of Figure 10 indicates that this interaction undoubtedly occurred because of the change in difference between U. S. and British Isles pupils at first grade; the difference becoming smaller at second grade, with British Isles students obtaining the higher mean at both the first and second grades. No other interactions were statistically significant for the variable of arithmetic fundamentals.

Figure 10

Interaction of Means For Arithmetic Fundmentals by Grade and Country

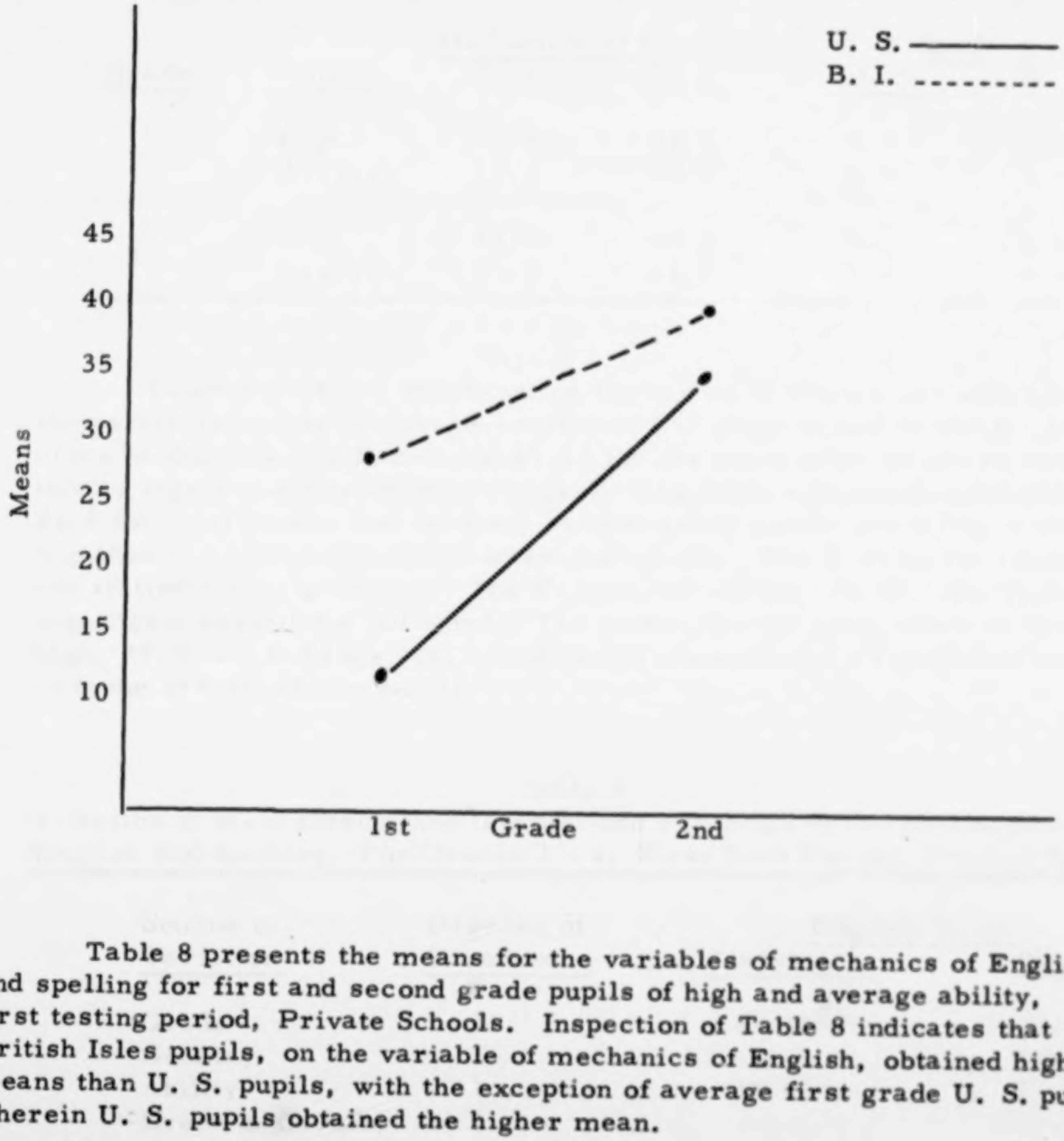


Table 8 presents the means for the variables of mechanics of English and spelling for first and second grade pupils of high and average ability, first testing period, Private Schools. Inspection of Table 8 indicates that British Isles pupils, on the variable of mechanics of English, obtained higher means than U. S. pupils, with the exception of average first grade U. S. pupils, wherein U. S. pupils obtained the higher mean.

Table 8
Means For Mechanics of English and Spelling, First Test Period, Grades 1 - 2, Private Schools

Grade	Ability	Mechanics of English U. S.	Mechanics of English B. I.	Spelling U. S.	Spelling B. I.
1	High	29.0	31.3	1.1	4.9
	Average	20.6	18.2	0.3	2.7
2	High	42.9	47.2	9.1	12.8
	Average	31.7	34.7	5.1	9.3

Table 9 presents the F-ratios for the main effects and interactions on the variables of English usage--mechanics of English and spelling. On mechanics of English, the F-ratio of 49.13 for the main effect of grade was statistically significant beyond the .01 level. The main effect mean for grade was 24.8 for first grade, and 38.4 for second-grade pupils indicating a statistically significant difference in favor of second-grade. The F-ratio for country was not statistically significant. The F-ratio for ability, 30.60, was statistically significant beyond the .01 level. The means for the main effect of ability were: high, 37.0; and average, 26.2, indicating a statistically significant difference in favor of high-ability pupils.

Table 9
F-Ratios of Main Effects and Interactions For English Usage-Mechanics of English and Spelling, For Grades 1 - 2, First Test Period, Private Schools

Source of Variation	Degrees of Freedom	English Usage Mechanics	English Usage Spelling
Grade	1	49.13**	94.64**
Country	1	-----	21.87**
Ability	1	30.60**	13.55**
Grade & Country	1	-----	-----
Grade & Ability	1	-----	3.52
Country & Ability	1	-----	-----
Grade & Country & Ability	1	-----	-----
Within	112		

** $p < .01$

Table 9 indicates that no other F-ratios were statistically significant on the interaction of main effects for the variable of mechanics of English. Table 8 also lists the means on the variable of spelling for first and second-grade pupils of high and average ability. British Isles pupils of high and average ability, first grade, obtained higher means than U. S. pupils of corresponding ability in first grade. U. S. pupils of high and average ability in second grade obtained higher means than British Isles pupils. Table 9 presents the F-ratios for the main effects of grade, country, and ability and their interactions on the variable of spelling (as well as mechanics of English). The main effect F-ratio for grade of 94.64 was statistically significant beyond the .01 level. The main effect mean for first grade was 1.7; and for second grade, 8.3, indicating a statistically significant difference in favor of second-grade pupils. The F-ratio of 21.87 for the main effect of country was also statistically significant beyond the .01 level. The main effect mean for U. S. being 3.9; British Isles, 7.4, indicating a statistically significant difference favoring British Isles. Also statistically significant was the main effect F-ratio for ability, 13.55. The main effect mean for ability of high ability students was 6.2; and for average ability pupils, 3.7, indicating a statistically significant difference in favor of high ability pupils on the variable of spelling. None of the interactions of the main effects of grade, country, or ability were statistically significant.

Table 10 presents a summary of the significance obtained for the main effects and interactions of reading, arithmetic and English usage for pupils in grades one and two located in private schools. Table 10 indicates that on all six variables a statistically significant F-ratio was obtained for grade favoring second-grade; and significant F-ratios for country were obtained on four variables--reading vocabulary and comprehension, arithmetic fundamentals, and spelling--favoring British Isles; and a statistically significant F-ratio was obtained for the main effect of ability favoring high ability pupils on all six variables. The significant interactions of grade by country on reading vocabulary and the second order interaction grade by country and ability reading vocabulary and the grade by country interaction on arithmetic fundamentals indicates interpretation must be made with caution for the main effects. In summary, on the variable of reading vocabulary, reading comprehension, arithmetic findamentals and spelling, all main effects of grade and country and ability were statistically significant. Further, wherein main effects were statistically significant, significance favored, respectively, grade two over grade one; British Isles over U. S.; and high ability over average-ability pupils. Only for the variables of arithmetic reasoning and mechanics of English were statistically significant differences for the main effect of country not obtained.

Table 10

Summary of Significant Main Effects[1] And Interactions For Variables of Reading, Arithmetic And English Usage, Grades 1 - 2, Private Schools, First Testing Period

	Reading Vocabulary	Reading Compre.	Arithmetic Reasoning	Arithmetic Fundamentals	Mechanics of English	Spelling
Grade	2nd	2nd	2nd	2nd	2nd	2nd
Country	B. I.	B. I.		B. I.		B. I.
Ability	H	H	H	H	H	H
Grade & Country	Sig. *			Sig. *		
Grade & Ability						
Country & Ability						
Grade & Country & Ability	Sig. *					

$^{*}p < .05$

Note: All main effects and interactions are significant at the .01 level except where asterisk denotes .05 level.

(2) Private Schools, Grades 3 thru 6

This section of the results deals with the first testing period for pupils enrolled in private schools, grades 3 through 6, for the six variables of reading-vocabulary, and comprehension; arithmetic-reasoning and fundamentals; and English usage-mechanics of English and spelling.

Table 11 presents the means for reading vocabulary and comprehension for high and average ability pupils in grades 3, 4, 5, and 6 for U. S. and British Isles. Inspection of the means for reading vocabulary indicates that British Isles pupils of both high and average ability in grades 3, 4, and 6 obtained higher means. However, at grade 5 U. S. pupils of high and average ability obtained higher means than did British Isles pupils. Reference to Table 12 indicates a statistically significant F-ratio for the main effect of grade. The main effect means were: grade three, 25.2; grade four, 33.8; grade five, 36.9; and grade six, 42.3. A significant F-ratio for ability was also obtained. The main effect means for ability were: high, 38.4; average, 30.3, indicating a statistically significant difference favoring high ability pupils on reading vocabulary. A statistically significant interaction of grade by country was present. Figure 11 is presented to aid in the interpretation of this significant interaction. Inspection of Figure 11 indicates that the probable cause of this interaction was the cross-over of the means for U. S. and British Isles at grades five and six with the British Isles mean at grades three and four having been higher, whereas at the fifth-grade the U. S. means were higher than the British Isles, but again lower than the British Isles at grade six.

Table 11
Means For Reading, Vocabulary And Comprehension, First Testing Period, Grades 3 - 6, Private Schools

		Vocabulary		Comprehension	
Grade	Ability	U. S.	B. I.	U. S.	B. I.
3	High	25.4	26.8	35.6	34.6
	Average	19.0	25.1	26.6	23.3
4	High	37.2	38.5	54.3	44.4
	Average	22.9	25.0	35.4	26.7
5	High	39.5	39.0	58.2	49.7
	Average	36.5	29.2	45.1	34.1
6	High	43.6	44.3	58.5	60.3
	Average	36.8	39.6	47.5	44.6

Table 12
F-Ratios of Main Effects and Interactions For Reading, Vocabulary, And Comprehension
Grades 3 - 6, First Test Period, Private Schools

Source of Variation	Degrees of Freedom	Reading	
		Vocabulary	Comprehension
Grade	3	70.68**	75.64**
Country	1	----	32.72**
Ability	1	101.85**	183.19**
Grade & Country	3	2.68*	5.07**
Grade & Ability	3	7.94**	2.42
Country & Ability	1	----	---
Grade & Country & Ability	3	1.99	---
Within	282		

* $p < .05$
** $p < .01$

Figure 11

Interaction of Means For Reading Vocabulary by Grade And Country

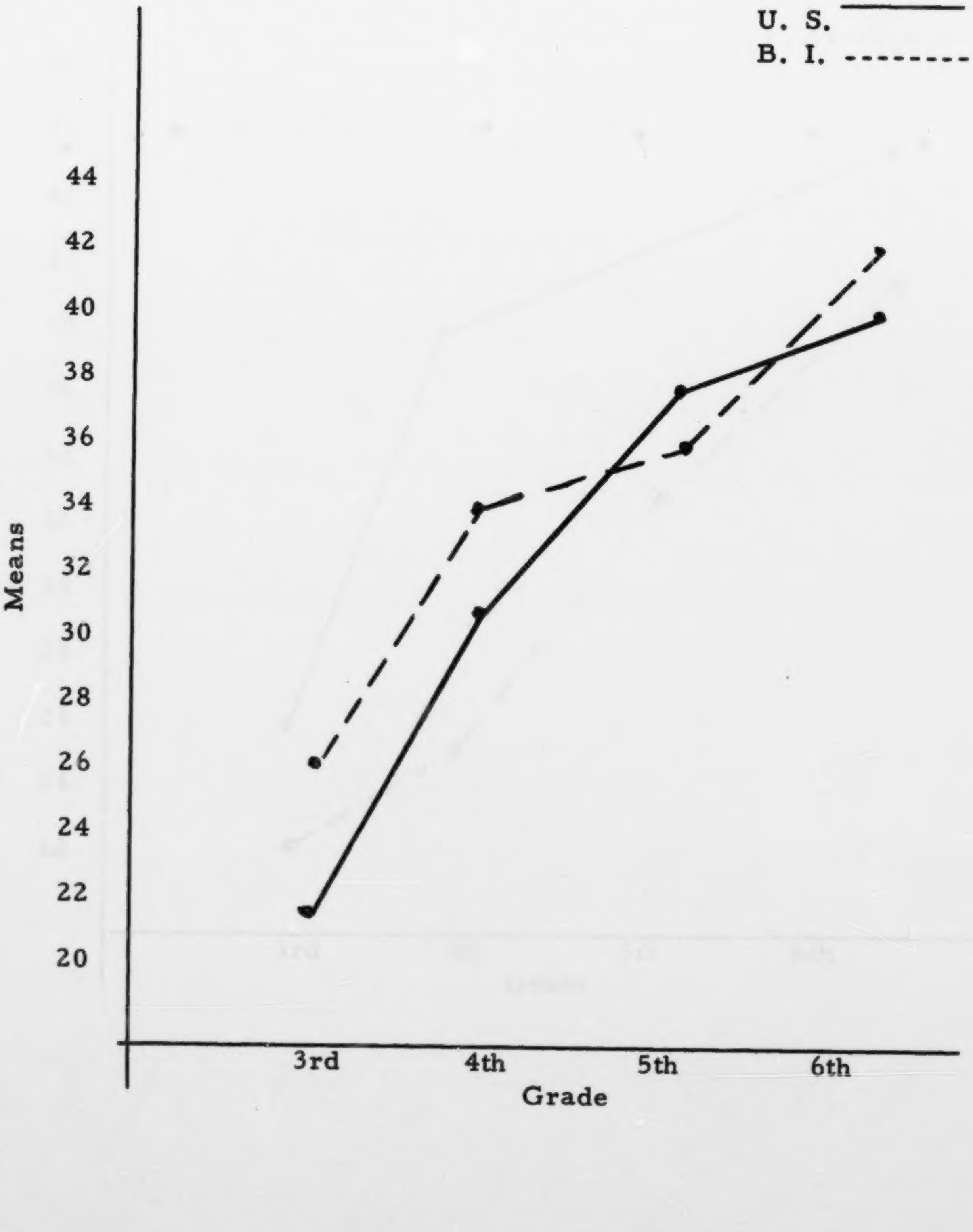


Figure 12
Interaction of Means For Reading Vocabulary by Grade And Ability

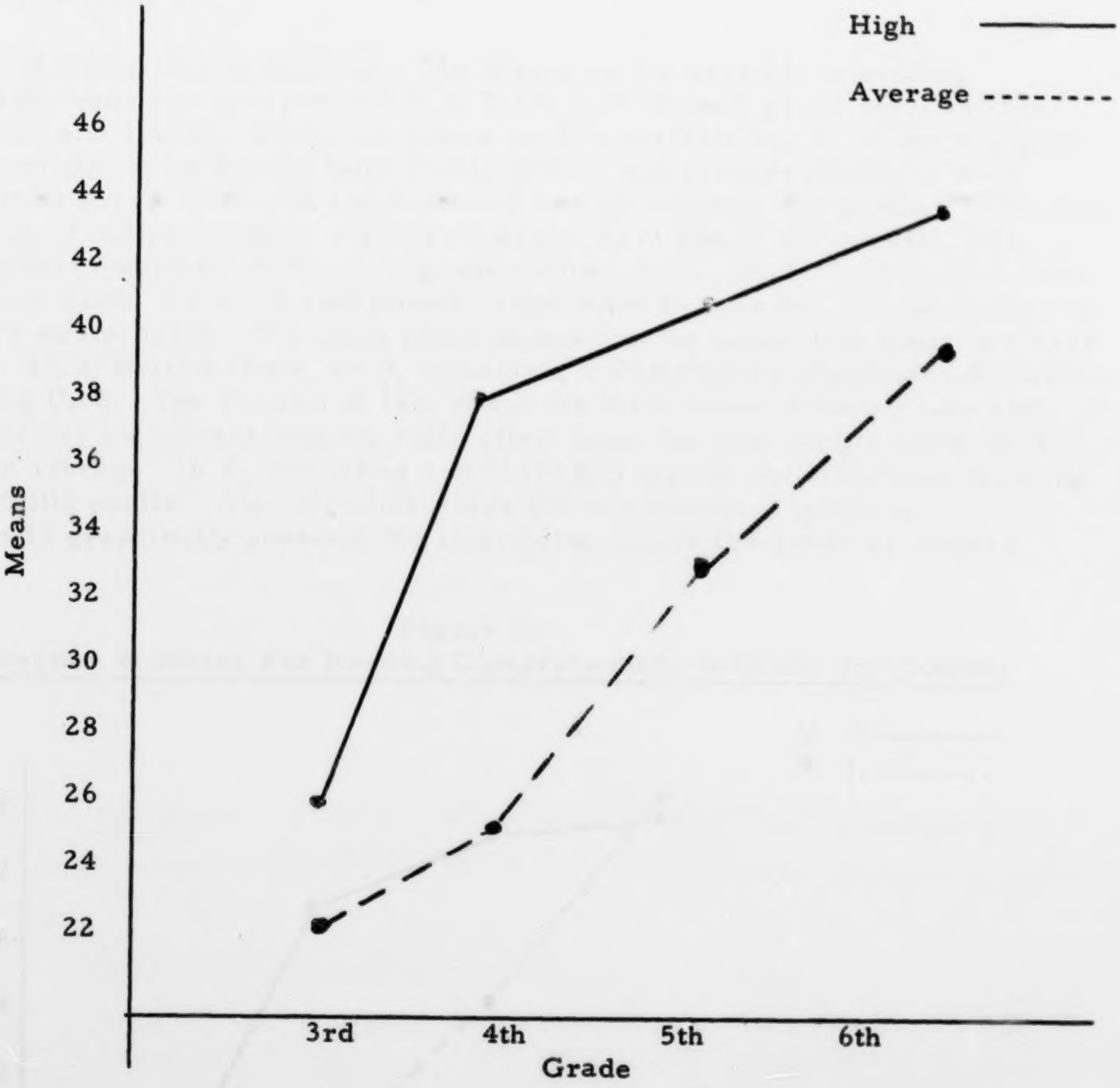
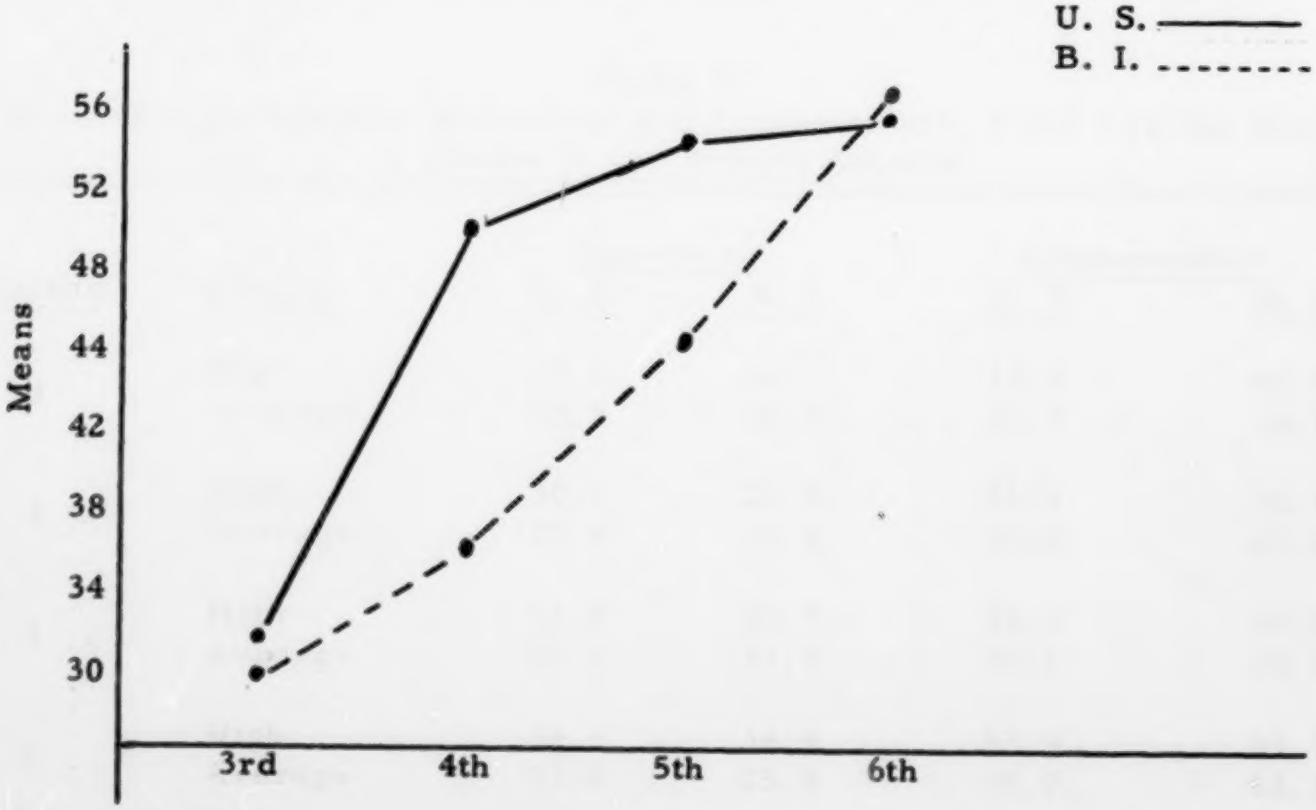


Table 12 also indicates a statistically significant grade by ability interaction. Figure 12 indicates that the possible cause of the significant interaction was due to the change in relative difference between high and average ability means at grades 3 and 4 and a continuation of a smaller difference at grades 5 and 6 between high and average ability means than present at grade 4.

Reading Comprehension--The means on the variable of reading comprehension are also presented in Table 11. At each grade level and for both high and average pupils the means on this variable for U. S. were higher than corresponding British Isles pupils of high and average ability at each respective grade level with the exception of high ability sixth-grade. Inspection of Table 12 indicates that a significant grade main effect was present. The main effect means for respective grades were: third, 31.7; fourth, 42.1; fifth, 48.4; and sixth, 55.2. A statistically significant F-ratio for the main effect of country was present. The main effect means for the respective countries were: U. S., 49.9; British Isles, 43.9, indicating a statistically significant difference favoring U. S. The F-ratio of 183.19 for the main effect of ability was also statistically significant with the main effect mean for high ability being 50.8 and for average, 36.0, indicating a statistically significant difference favoring high ability pupils. Also significant was the interaction of grade by country. Figure 13 graphically presents the interaction means for grade by country.

Figure 13

Interaction of Means For Reading Comprehension by Grade and Country



The probable cause of the interaction was the relative difference of U. S. and British Isles means at the third grade which became greater at grades 4 and 5 favoring the U. S. in each instance but with a subsequent cross-over at grade 6 wherein British Isles mean was higher than U. S.

Reasoning and Fundamentals--Table 13 contains the means for the variables of arithmetic reasoning and arithmetic fundamentals for pupils in private schools on the first testing. Inspection of Table 13 for arithmetic reasoning indicates that the means for U. S. pupils of high and average ability at each grade level were higher than corresponding high and average British Isles pupils at the respective grades. However, on the variable of arithmetic fundamentals the reverse is true with one exception; namely, that average fifth-grade pupils in U. S. and British Isles obtained essentially the same means, whereas for pupils of high and average ability in grades 3, 4, and 6 and high ability fifth graders, the British Isles means were higher.

Table 14 presents the F-ratios for main effects and interactions on the variables of arithmetic reasoning and fundamentals for private school pupils in grades 3 to 6 on the first testing period. Significance was obtained on each of the main effects of grade, country, and ability on the variable of arithmetic reasoning. The main effect means for grade were: third, 16.4, fourth, 25.4; fifth, 29.1; and sixth, 32.8. The main effect means for country were U. S., 29.8; and British Isles, 25.8, indicating a statistically significant difference favoring U. S. pupils. The main effect means for ability were: high, 29.1; and average, 23.3, indicating a significant difference favoring high ability pupils. The grade by ability interaction was signigicant at the .05 level. Figure 14 graphically presents the means for the grade by ability interaction.

Table 13
Means For Arithmetic, Reasoning And Fundamentals, First Testing Period, Grades 3 - 6, Private Schools

		Reasoning		Fundamentals	
Grade	Ability	U. S.	B. I.	U. S.	B. I.
3	High	20.2	16.1	19.4	23.4
	Average	15.8	12.4	16.0	16.8
4	High	30.1	26.5	26.1	32.8
	Average	23.4	18.8	19.8	25.4
5	High	32.9	28.9	35.3	38.7
	Average	30.0	23.8	30.6	30.5
6	High	35.9	34.4	52.9	53.6
	Average	31.4	25.9	38.0	43.3

Table 14
F-Ratios For Main Effects And Interactions of Arithmetic Reasoning, And Fundamentals
Grades 3 - 6, First Testing Period, Private Schools

Source of Variation	Degrees of Freedom	Arithmetic Reasoning	Arithmetic Fundamentals
Grade	3	130.40**	123.71**
Country	1	55.07**	7.32**
Ability	1	104.74**	50.84**
Grade and Country	3	----	1.83
Grade and Ability	3	2.99*	1.88
Country and Ability	1	2.22	----
Grade and Country and Ability	3	----	----
Within	282		

* $p < .05$
** $p < .01$

Figure 14
Interaction of Means For Arithmetic Reasoning by Grade And Ability

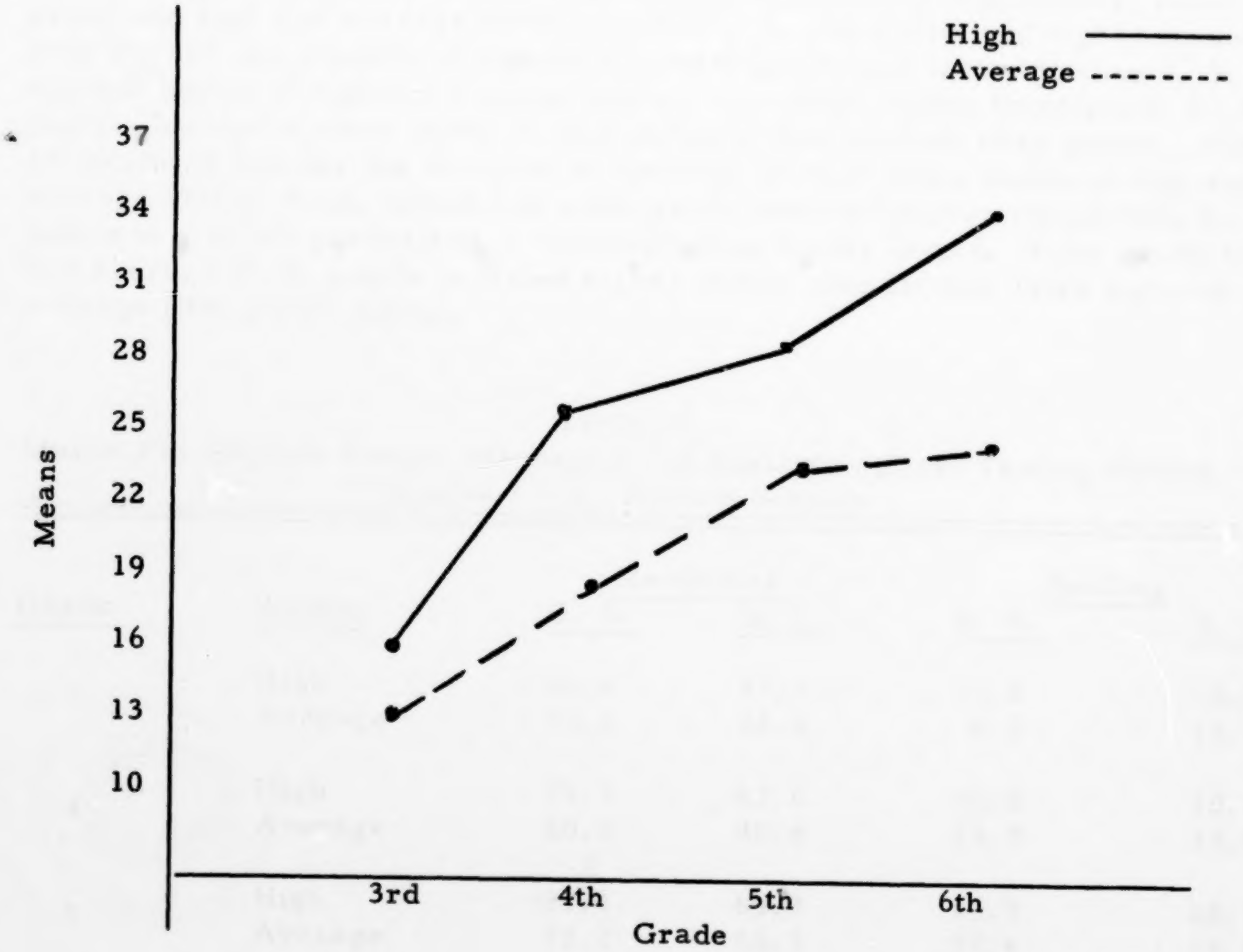


Figure 14 indicates that the probable cause of the significant interaction was the change in difference in means at grade four contrary to the differences that occurred at grade 3 and occurred again at grade 5 with a correspondingly greater difference at grade 6. The F-ratio for the main effects of grade, country, and ability on the variable of arithmetic fundamentals as indicated in Table 14 were all significant beyond the .01 level. The main effect means for grade were: third, 20.2; fourth, 28.4; fifth, 35.1; and sixth, 49.6. The means for the main effect of country were: U. S., 33.2; and British Isles, 36.2, indicating a statistically significant difference favoring the British Isles. The means for the main effect of ability were: high, 37.6; and average 29.6, indicating a statistically significant difference in favor of high ability pupils.

Table 15 presents the means for the variable of English usage--mechanics of English and spelling, for pupils located in private schools, grades 1 - 2 on results from the first testing period. Table 15 indicates that on the variable of mechanics of English, U. S. pupils of high ability, third grade and high and average ability grades 4, 5, and 6 obtained higher means than British Isles pupils of high ability third grade and corresponding 4, 5, and 6 grade pupils of high and average ability. Average ability third grade U. S. pupils obtained a lower mean on this variable than British Isles pupils. Table 15 indicates that for the variable of spelling, British Isles pupils of high and average ability third, fourth and sixth grade obtained higher means than U. S. pupils in similar grades and of corresponding ability levels. Fifth-grade high and average U. S. pupils obtained higher means than British Isles high and average fifth-grade pupils.

Table 15
Means For English Usage, Mechanics and Spelling - First Testing Period, Grades 3 - 6, Private Schools

Grade	Ability	Mechanics		Spelling	
		U. S.	B. I.	U. S.	B. I.
3	High	46.4	43.7	11.4	15.5
	Average	36.6	42.4	8.6	13.4
4	High	79.1	67.6	20.0	20.1
	Average	60.0	40.6	13.7	13.9
5	High	87.1	69.3	20.9	20.5
	Average	71.2	51.3	17.6	16.4
6	High	87.3	85.2	21.8	25.2
	Average	76.3	72.6	17.9	23.6

Table 16 presents the F-ratios of main effects and interactions for the variable of English usage--mechanics of English and spelling. F-ratios were statistically significant for the main effects of grade, country and ability and for the interactions of grade by country and grade by ability on the variable of mechanics of English. The main effects means for grade were: third grade, 43.3; fourth, 63.8; fifth, 70.9; and sixth grade, 82.2. The means for the main effects of country and ability were, respectively, U. S. 74.8; and British Isles 64.1; and high ability 73.2, and average, 57.1, indicating a statistically significant difference between U. S. and British Isles favoring U. S., and a statistically significant difference between high and average ability favoring the former.

Figure 15 graphically presents the interaction of means for the mechanics of English by grade and country. The interaction probably occurred because of the greater differences between the means at the fourth and fifth grade for U. S. and British Isles favoring the former with a considerably smaller difference at both grades 3 and 6. Figure 16 presents the interaction of the means by grade and ability on the variable of mechanics of English. This interaction undoubtedly occurred because of the relative change in differences of high and average ability means at the respective grade levels with a small difference at grade 3 and a much larger difference at grade 4 which correspondingly became smaller at grades 5 and 6. Table 16 also presents the F-ratios for spelling.

Table 16
F-Ratios of Main Effects And Interactions For English Usage, Mechanics And Spelling, First-Testing Period, Grades 3 - 6, Private Schools

Source of Variation	Degrees of Freedom	English Usage	
		Mechanics	Spelling
Grade	3	80.56**	42.69**
Country	1	42.79**	6.95**
Ability	1	89.77**	43.82**
Grade & Country	3	6.08**	5.59**
Grade & Ability	3	5.53**	2.55
Country & Ability	1	----	----
Grade & Country & Ability	3	----	----
Within	282		

** $p < .01$

Figure 15

Interaction of Means For Mechanics of English by Grade and Country

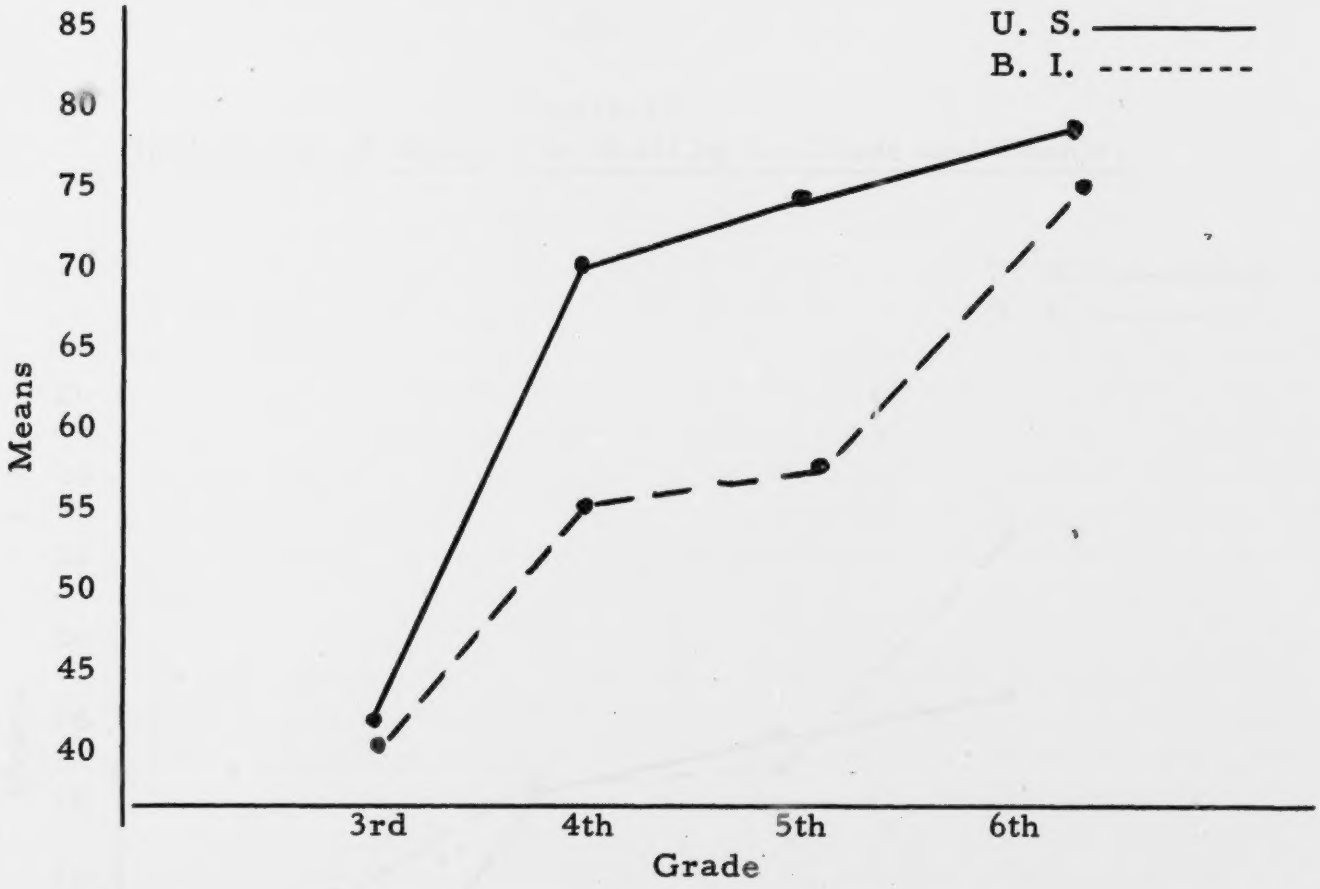


Figure 16

Interaction of Means For Mechanics of English by Grade and Ability

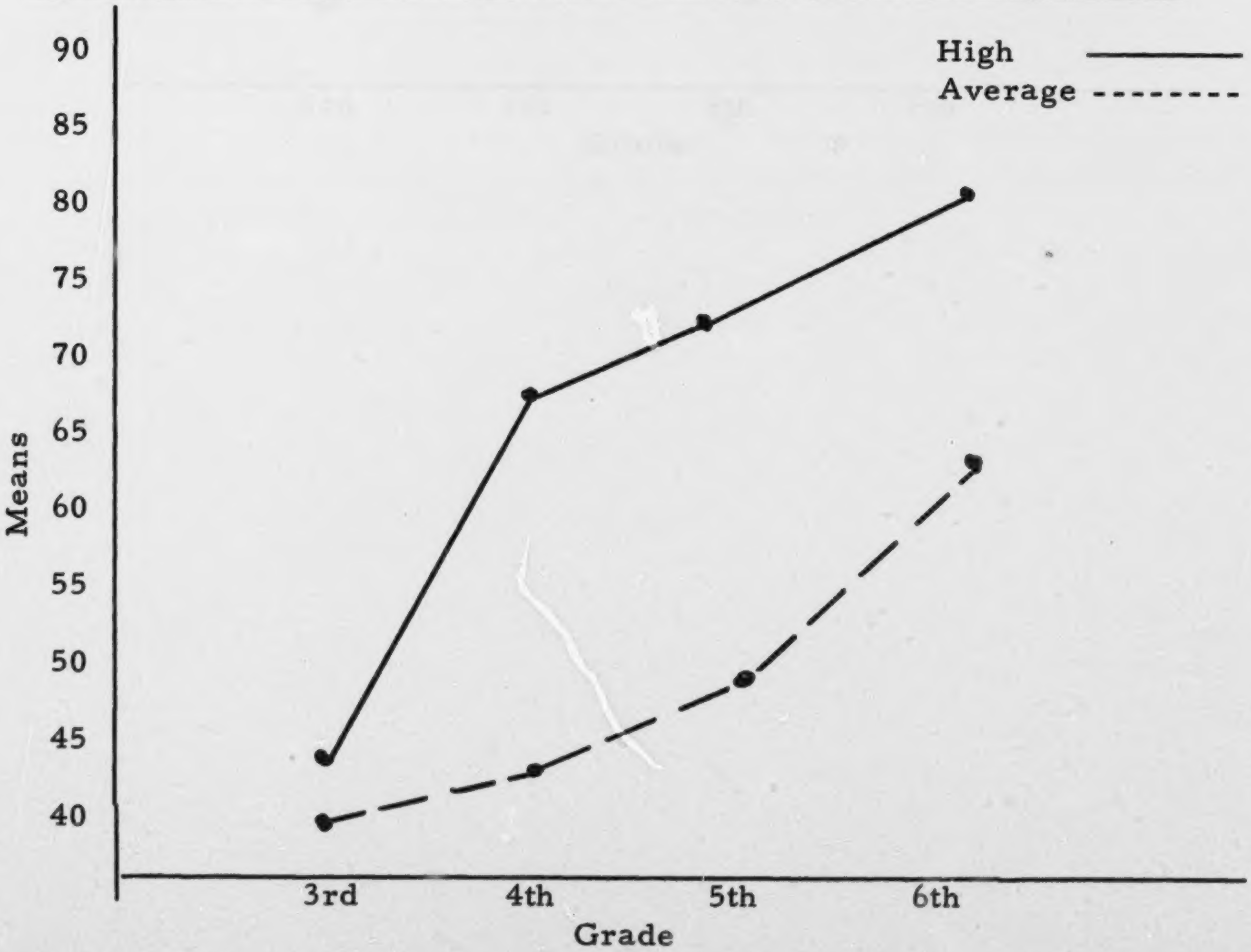
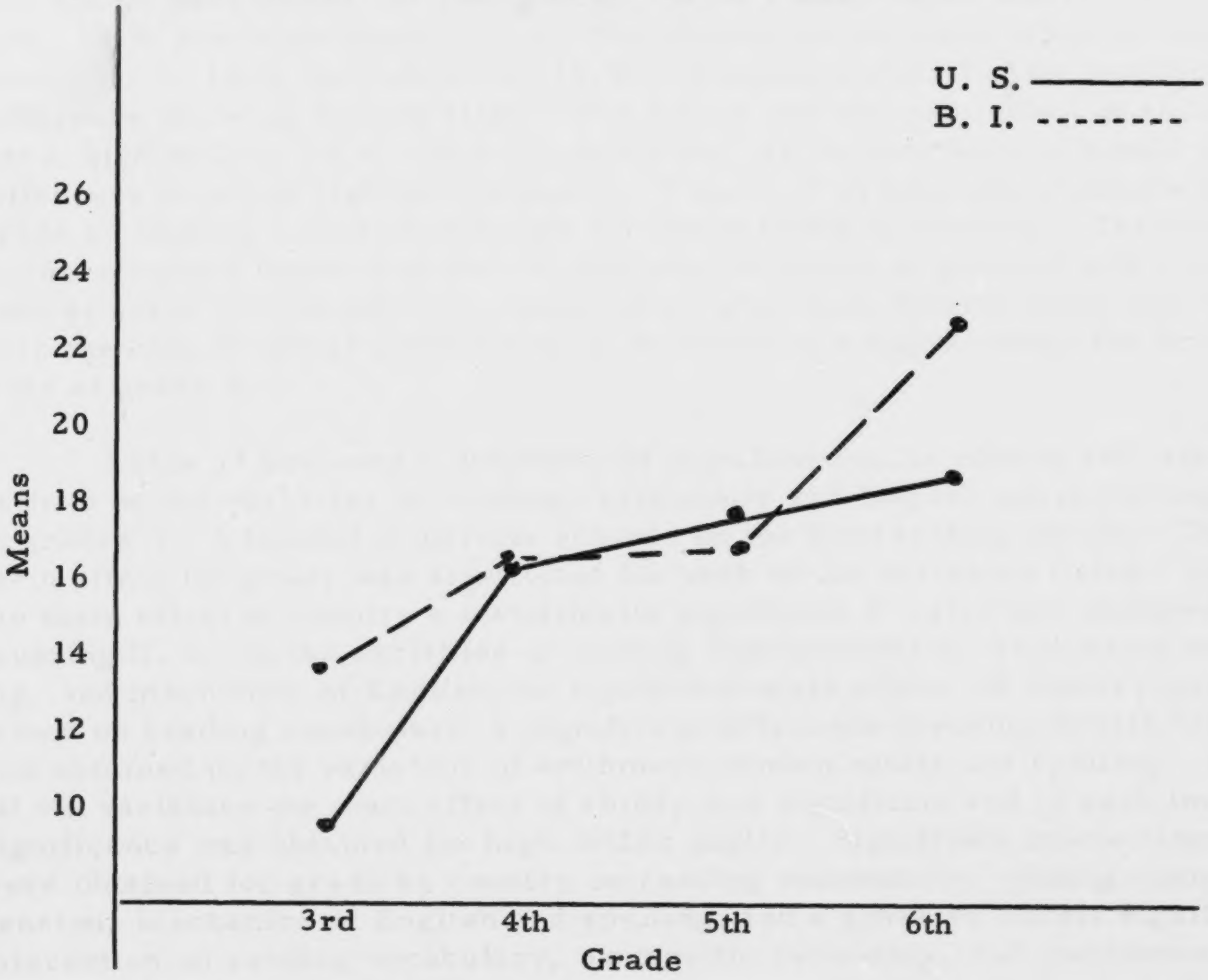


Figure 17

Interaction of Means For Spelling by Grade and Country



The main effects of grade and country and ability and the interaction of grade by country all were statistically significant beyond the .01 level. The main effect means for grade were: third grade, 13.2; fourth, 18.1; fifth, 19.4; and sixth grade, 23.1. The means for the main effect of country were: U. S. 18.3; British Isles, 19.8, indicating a statistically significant difference favoring British Isles. The means for the main effect of ability were: high ability, 20.4; and average ability, 16.5, indicating a significant difference favoring high ability pupils. Figure 17 graphically presents the grade by country interaction means for the variable of spelling. This interaction occurred because of the convergence of means at grade 4 with a cross over at grade 5 in which U. S. mean was higher than British which had not been the case at either grades 3 or 4, followed by a higher mean for British Isles at grade 6.

Table 17 presents a summary of significant main effects and interactions on the variables of reading, arithmetic and English usage for pupils in grades 3 - 6 located in private schools on the first testing period. The main effect for grade was significant for each of the variables listed. On the main effect of country a statistically significant F-ratio was obtained favoring U. S. on the variables of reading comprehension, arithmetic reasoning, and mechanics of English; no significant main effect of country was obtained on reading vocabulary; a significant difference favoring British Isles was obtained on the variables of arithmetic fundamentals and spelling. On all six variables the main effect of ability was significant and in each instance significance was obtained for high ability pupils. Significant interactions were obtained for grade by country on reading vocabulary, reading comprehension, mechanics of English and spelling; and a grade by ability significant interaction on reading vocabulary, arithmetic reasoning, and mechanics of English thereby necessitating caution in interpreting the significance obtained for the main effects for each respective variable.

Table 17

Summary of Significant Main Effects[1] and Interactions For Variables of Reading, Arithmetic and English Usage, Grades 3 - 6, Private Schools, First Testing Period

	Reading Vocabulary	Reading Compre.	Arithmetic Reasoning	Arithmetic Fundamentals	Mechanics of English	Spelling
Grade	Sig.	Sig.	Sig.	Sig.	Sig.	Sig.
Country		U. S.	U. S.	B. I.	U. S.	B. I.
Ability	H	H	H	H	H	H
Grade & Country	Sig.	Sig.			Sig.	Sig.
Grade & Ability	Sig.		Sig.		Sig.	
Country & Ability						
Grade & Country & Ability						

---

* $p < .05$

[1] All main effects are significant at .01 level except where asterisk denotes .05 level.

(3) Public Schools, Grades One And Two

This section will deal with the results for the pupils of high, average and low ability, grades one and two, U. S. and British Isles on the dependent variables of reading--vocabulary and comprehension; arithmetic--reasoning and fundamentals; and English usage--mechanics of English and spelling for those pupils located in public schools, first testing period, grades one and two.

Table 18 presents the means for the variables of reading vocabulary and comprehension. Inspection of Table 18 indicates that high and average pupils, first grade, British Isles, and average and low ability second grade British Isles pupils obtained higher means than for respective grade and ability level U. S. pupils; low ability first-grade U. S. pupils obtained a higher mean than British Isles low ability first-grade pupils. Second-grade high ability U. S. and British Isles pupils obtained similar mean achievement on reading vocabulary.

On the variable of reading comprehension the same pattern exists at first grade for high and average ability British Isles and U. S. students as was the case for vocabulary, namely, higher means for British Isles pupils. Essentially the same mean was obtained for low ability first-grade U. S. and British Isles pupils. High, average, and low ability second-grade U. S. pupils obtained a higher mean than British Isles high, average, low ability second-grade pupils.

Table 18
Means For Reading, Vocabulary And Comprehension, First Testing Period, Grades 1 - 2, Public Schools

Grade	Ability	Vocabulary U. S.	Vocabulary B. I.	Comprehension U. S.	Comprehension B. I.
1	High	29.8	53.0	1.5	7.3
	Average	24.5	37.2	1.2	2.7
	Low	27.6	23.8	1.0	0.6
2	High	62.7	62.7	10.2	8.4
	Average	55.3	57.0	7.2	7.1
	Low	49.8	51.8	6.3	5.3

Table 19 presents the F-ratios for the main effects and their interactions for the variables of reading vocabulary and comprehension for first testing, grades one and two for pupils in public schools. The F-ratios for the main effect of grade and country and ability on reading vocabulary were all statistically significant beyond the .01 level. On reading vocabulary, the means for the main effect of grade were: first grade, 30.3; second grade, 57.5, indicating a significant difference favoring second grade. The means for the main effect of country were: U. S., 40.3; and British Isles 48.6, indicating a significant difference favoring the British Isles. The means for the significant main effects of ability were 47.1 for high ability; 39.7 for average; and 37.0 for low ability. The grade by country interaction was also significant. Figure 18 graphically presents the means for the interaction of grade by country. The possible cause for the interaction was the change in slope of the respective means with a convergence at grade two with the relative difference between the higher British Isles mean having become smaller at grade two than had been the case at grade one. Table 19 also indicates a significant F-ratio for the interaction of country by ability. Figure 19 presents the means for the interaction of country by ability. This interaction undoubtedly occurred because of the cross-over of means for U. S. and British Isles average and low ability pupils. The F-ratios for the main effects of grade and country and ability on the variable of reading comprehension, as reported in Table 19, were also all statistically significant beyond the .01 level. The means for the main effect of grade were: first grade, 1.9; second grade, 8.0, indicating a significant difference favoring second grade. The means for the main effect of country were: U. S., 4.3; British Isles, 5.5, indicating a significant difference favoring British Isles. The means for the main effect of ability were: high, 5.9; average, 4.0, and low, 3.1. Significant F-ratios were also obtained on the variable of reading comprehension for the interaction of grade by country; grade by ability; and country by ability. Figures 20, 21, and 22 graphically present the means for these interactions. Figures20 and 22 indicate that the probable cause for the respective interactions, grade by country, and country by ability, were due to the cross-overs in means for main effects. Figure 21 indicates that the possible cause of the grade by ability interaction was due to the relative change in difference among the three ability levels at the respective grades.

Table 19

F-Ratios of Main Effects And Interactions For Reading, Vocabulary, And Comprehension

First Testing Period, Grades 1 - 2, Public Schools

Source of Variation	Degrees of Freedom	Reading	
		Vocabulary	Comprehension
Grade	1	859.83**	479.91**
Country	1	56.47**	12.66**
Ability	2	40.70**	30.89**
Grade & Country	1	34.22**	33.71**
Grade & Ability	2	1.64	3.47*
Country & Ability	2	11.02**	6.02**
Grade & Country & Ability	2	10.83**	11.13**
Within	497		

** $p < .01$

Figure 18

Interaction of Means on Reading Vocabulary, Public Schools, Grade by Country

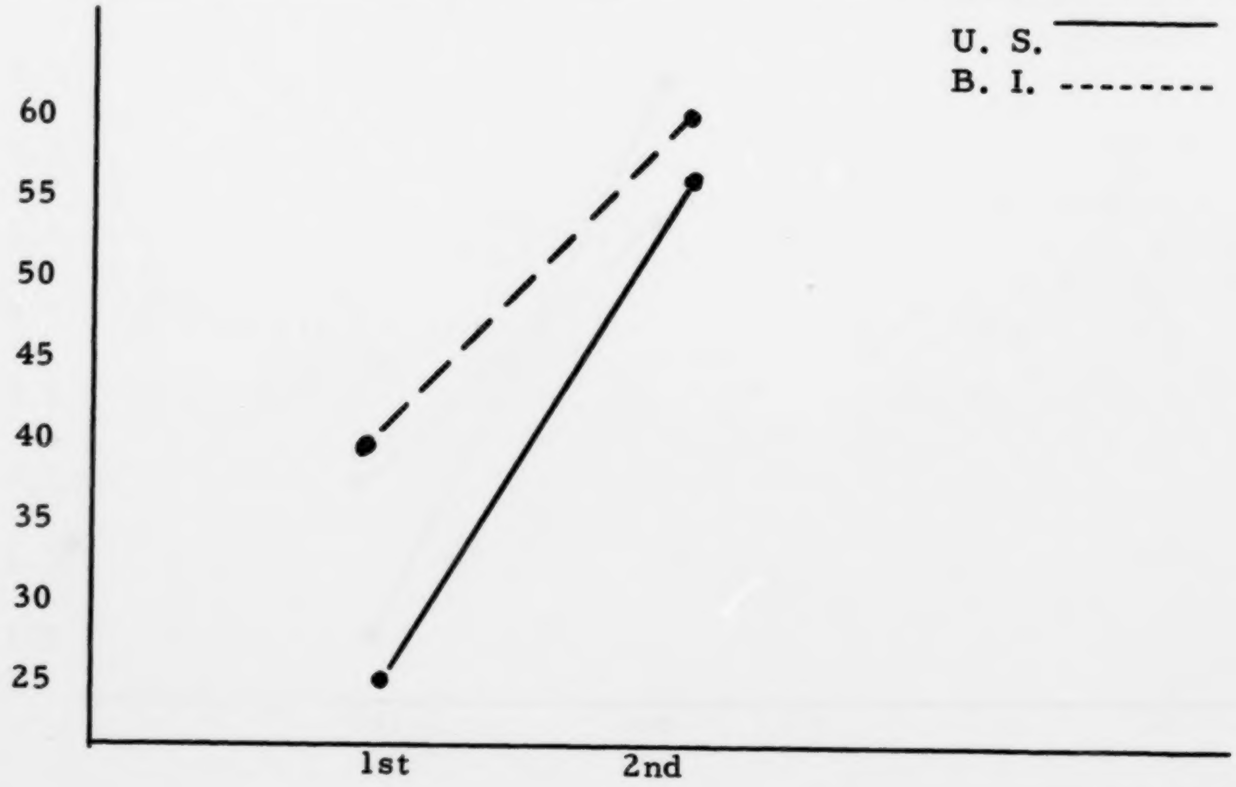


Figure 19

Interaction of Means on Reading Vocabulary, Public Schools, Country & Ability

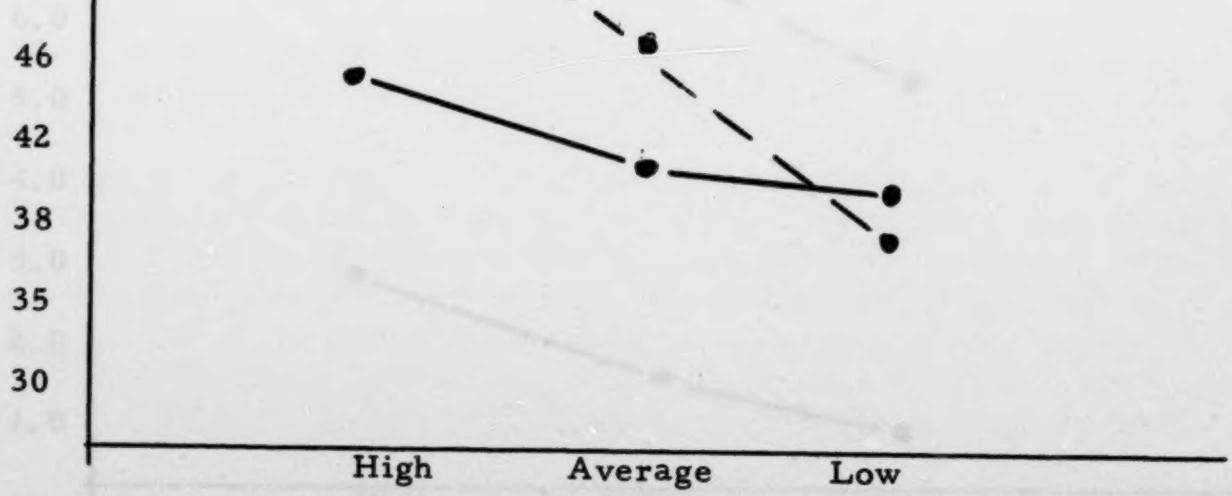


Figure 20
Interaction of Raw Score Means on Reading Comprehension, Public Schools
Grade & Country

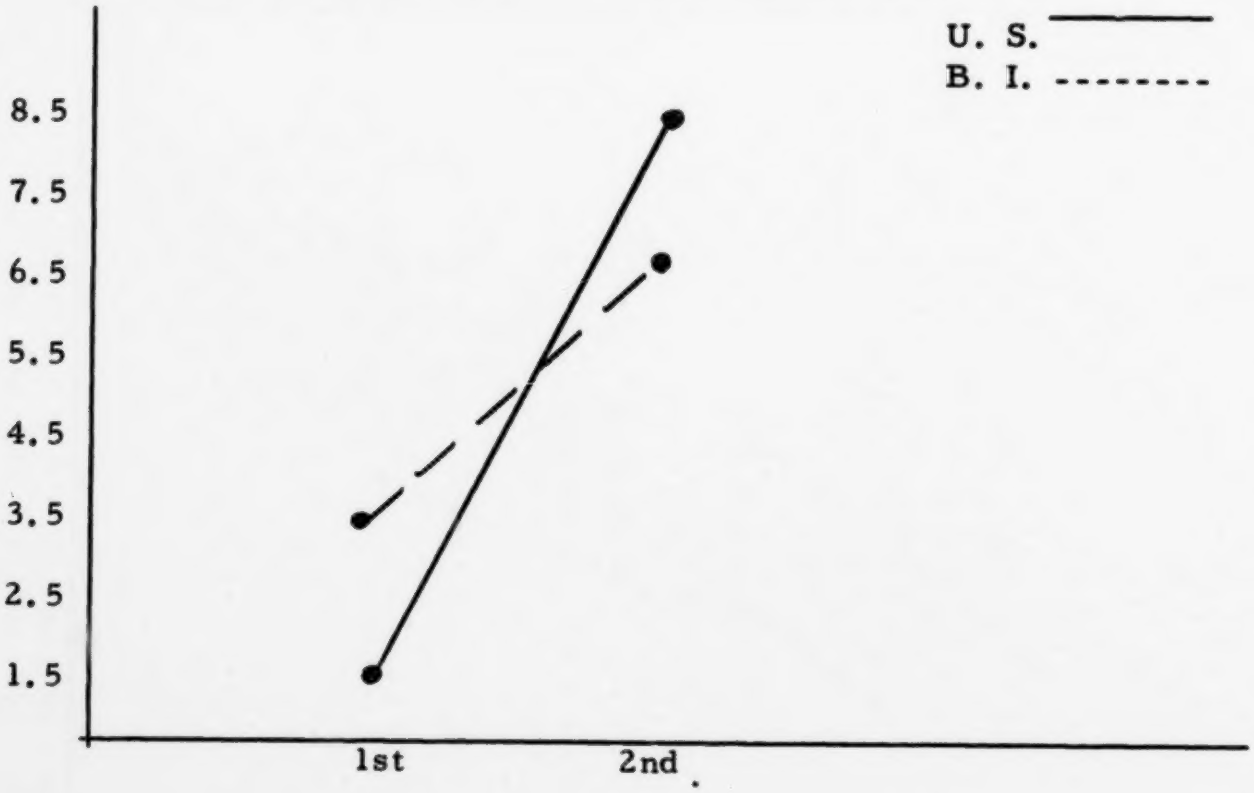


Figure 21
Interaction of Raw Score Means on Reading Comprehension, Grade by Ability

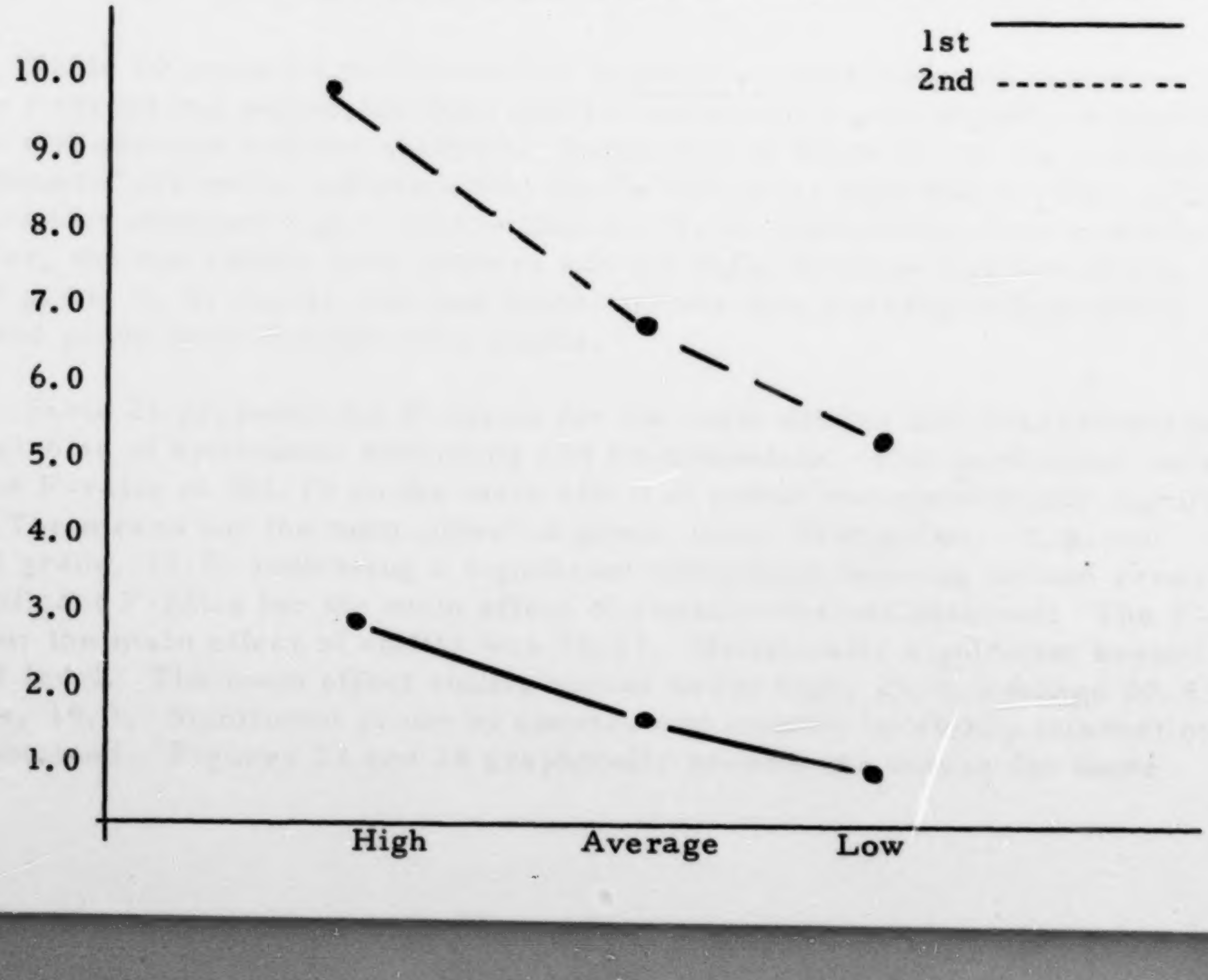


Figure 22

Interaction on Reading Comprehension, Ability by Country

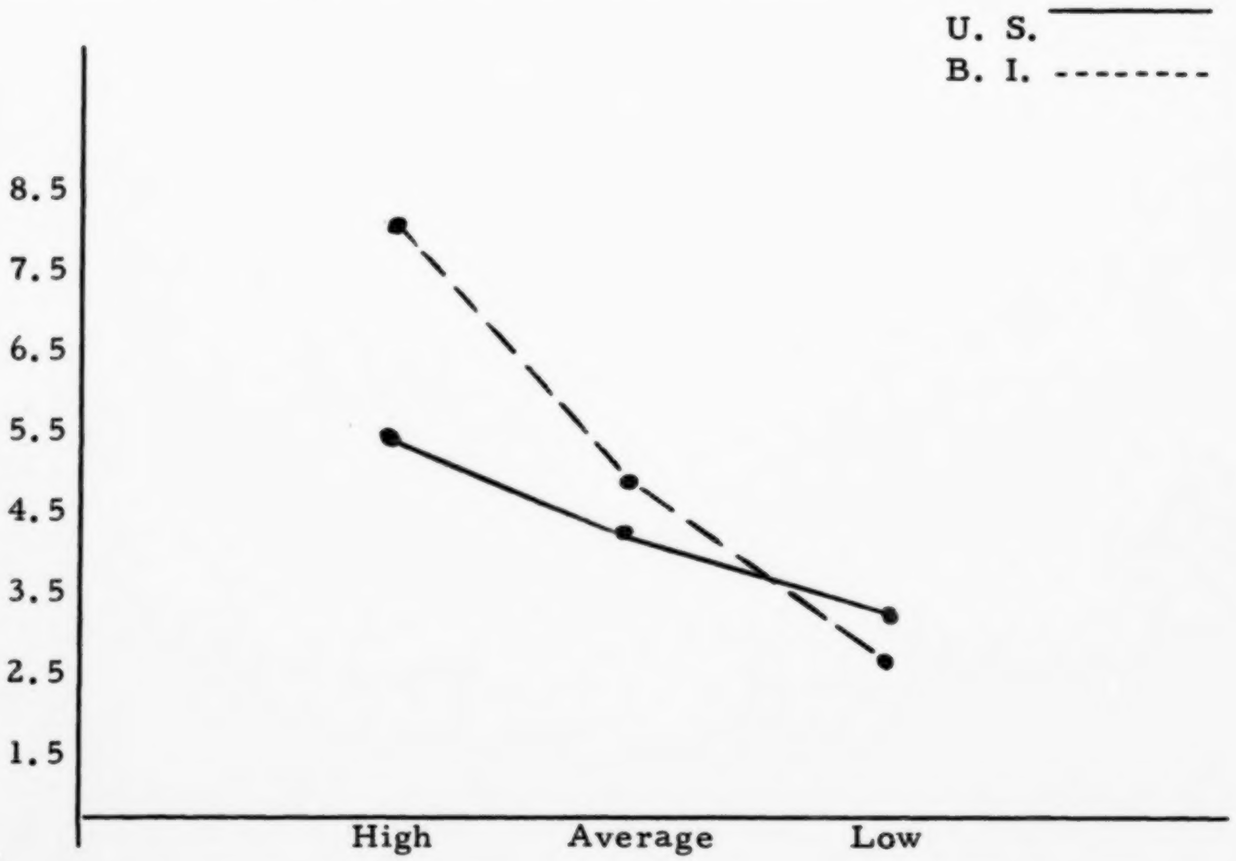


Table 20 presents the means for arithmetic-reasoning and fundamentals, for the first testing period for first and second grade pupils in public schools of high and average and low abilities. Inspection of Table 20 for the variable of arithmetic reasoning indicates that the British Isles high and average ability first graders obtained higher means than the U. S. high ability first graders. However, the low ability first graders and the high, average and low ability second grade U. S. pupils obtained higher means than corresponding ability level and grade level British Isles pupils.

Table 21 presents the F-ratios for the main effects and interactions on the variables of arithmetic reasoning and fundamentals. For arithmetic reasoning, the F-ratio of 745.19 on the main effect of grade was statistically significant. The means for the main effect of grade were: first grade, 15.0; and second grade, 31.2, indicating a significant difference favoring second grade. A significant F-ratio for the main effect of country was not obtained. The F-ratio for the main effect of ability was 34.23, statistically significant beyond the .01 level. The main effect ability means were: high, 25.0; average 20.4; and low, 19.3. Significant grade by country and country by ability interactions were obtained. Figures 23 and 24 graphically present the means for these respective interactions. Undoubtedly the interaction as shown in Figure 23 occurred because of the cross-over between means at the second grade for U. S. and British Isles with the former being higher at second whereas at first grade, the U. S. mean was lower. Figure 24, the country by ability interaction, indicates that this interaction undoubtedly occurred because of the cross-over of means at the average and low ability categories.

Table 20
Means For Arithmetic, Reasoning and Fundamentals, First Testing Period, Grades 1 - 2, Public Schools

Grade	Ability	Reasoning U. S.	Reasoning B. I.	Fundamentals U. S.	Fundamentals B. I.
1	High	15.5	28.0	7.6	30.2
	Average	11.8	17.3	5.9	21.2
	Low	13.5	7.6	8.5	9.3
2	High	34.5	30.4	37.1	38.6
	Average	30.5	28.0	31.5	39.1
	Low	31.4	19.0	33.3	37.2

Table 21
F-Ratios of Main Effects And Interactions For Arithmetic, Reasoning, And Comprehension, First Testing Period, Grades 1 - 2, Public Schools

Source of Variation	Degrees of Freedom	Arithmetic Reasoning	Arithmetic Fundamentals
Grade	1	745.19**	1241.17**
Country	1	3.74	167.56**
Ability	2	34.23**	13.90**
Grade & Country	1	61.45**	45.37**
Grade & Ability	2	-----	----
Country & Ability	2	25.79**	12.75**
Grade & Country & Ability	2	4.93**	14.45**
Within	497		

** $p < .01$

Figure 23
Interaction on Arithmetic Reasoning, Grade by Country

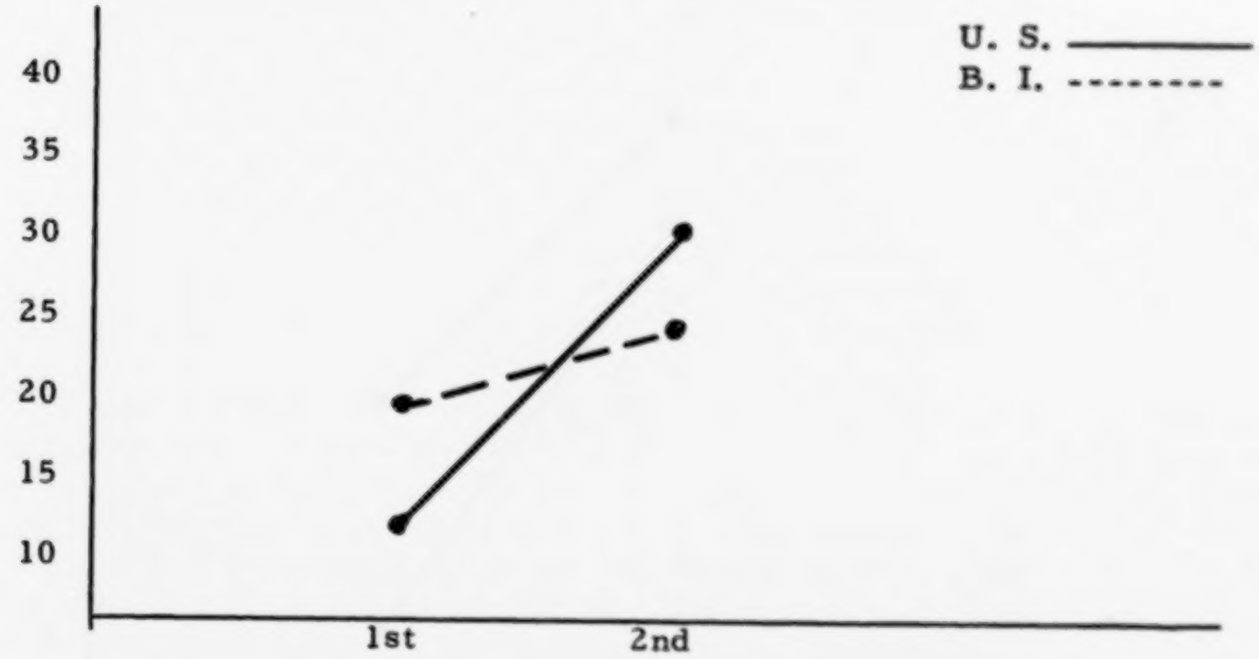


Figure 24
Interaction on Arithmetic Reasoning, Country by Ability

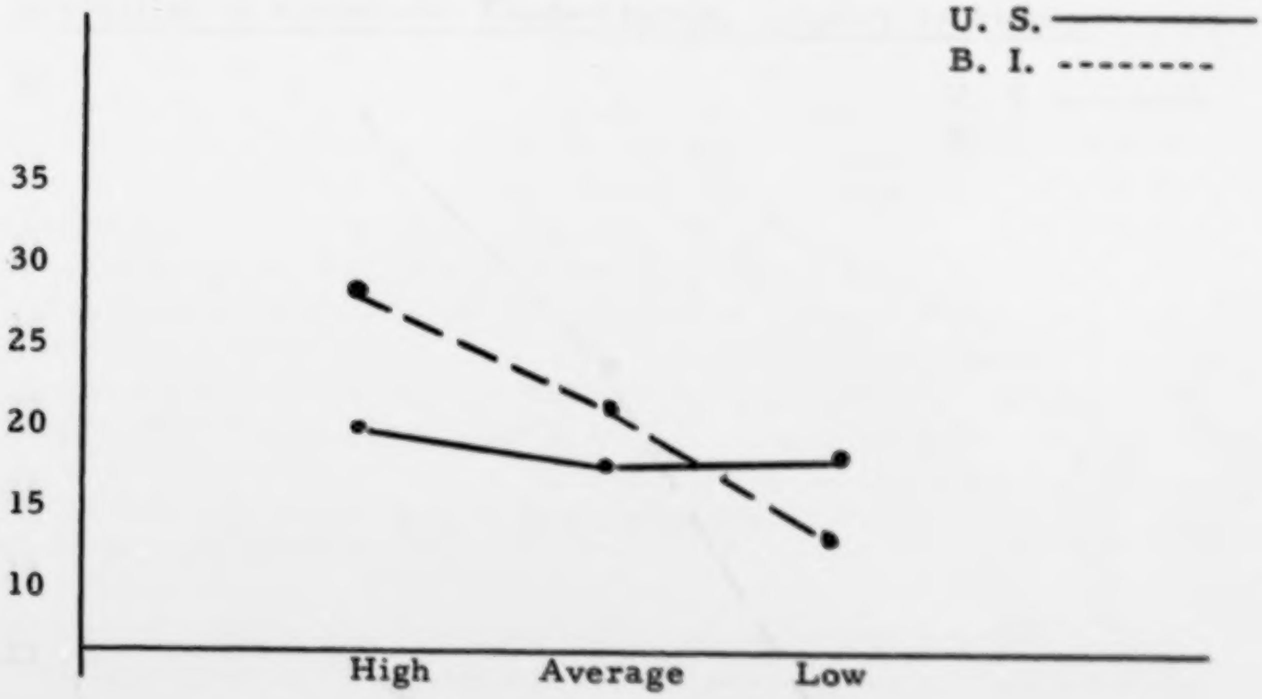


Figure 25
Interaction on Arithmetic Fundamentals, Grade by Country

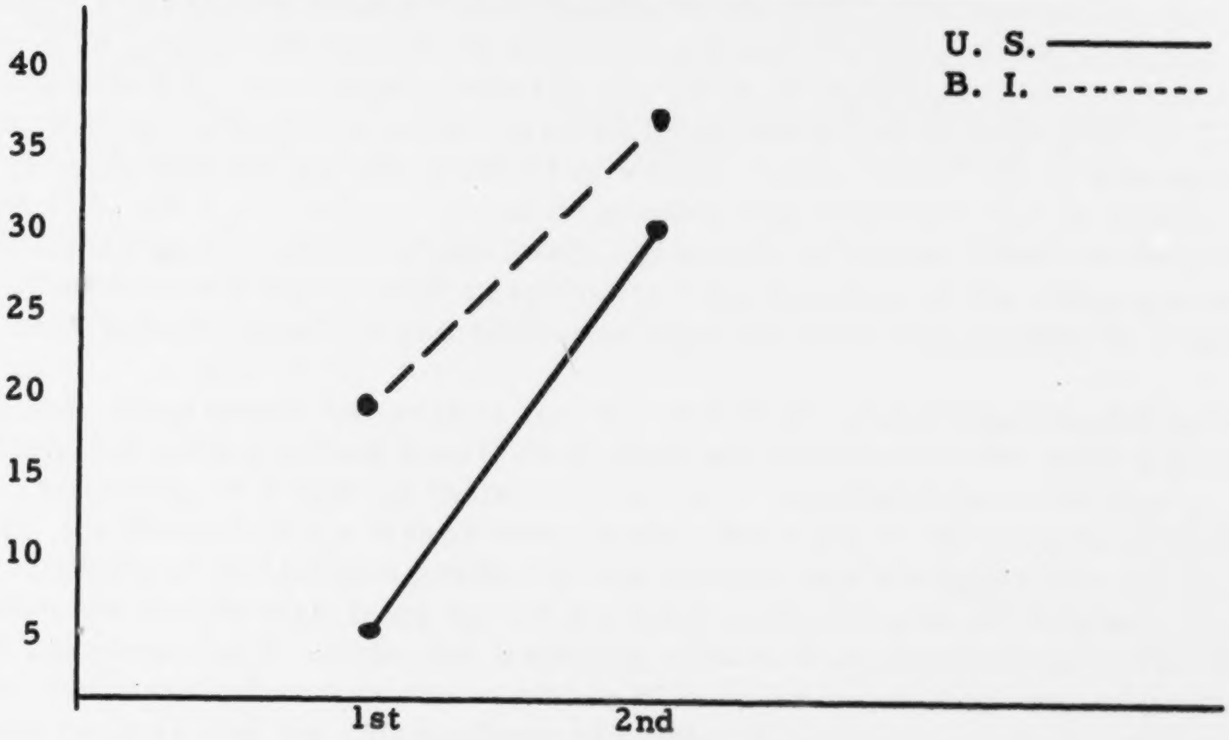


Figure 26
Interaction on Arithmetic Fundamentals, Country by Ability

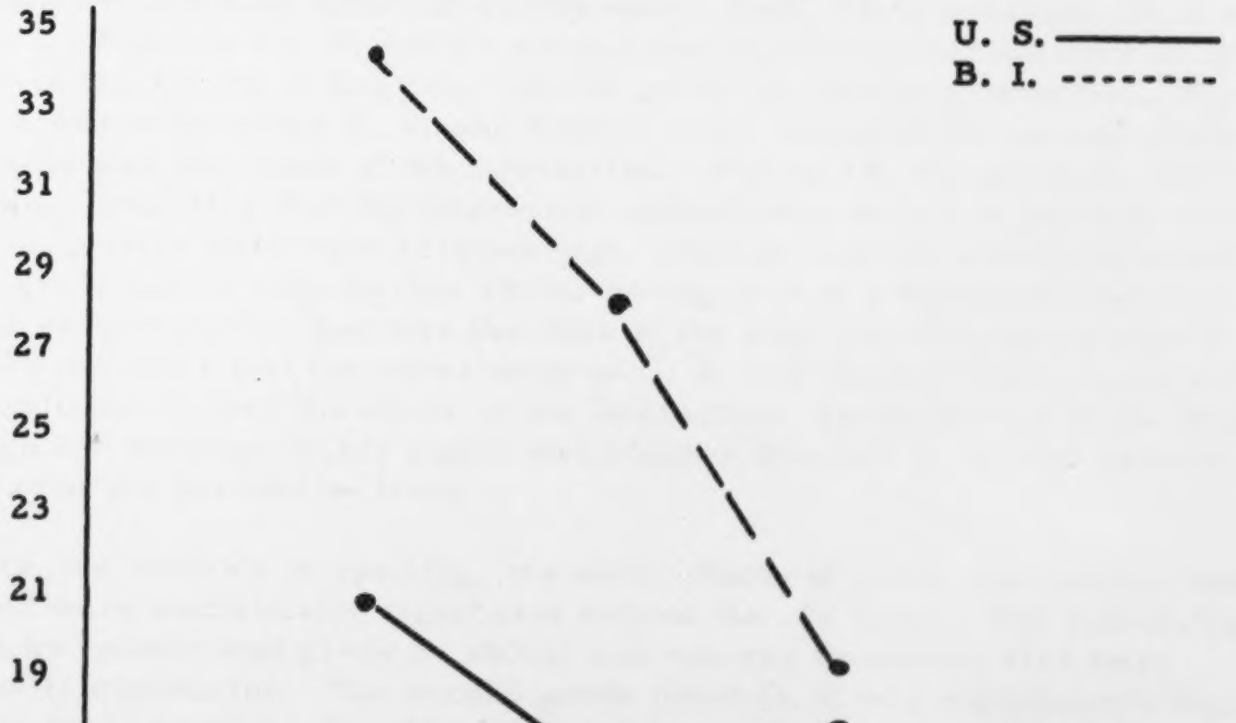


Table 20 also presents the means for arithmetic fundamentals. In every instance at respective grade and ability levels, the British Isles means were higher than the U. S. means. Table 21 indicates that significant F-ratios were obtained for the main effects of grade, country and ability, and for the interactions of grade by country and country by ability. The means for the main effect of grade indicated a statistically significant difference favoring second grade (35.1) over first grade (10.6). The British Isles, on the main effect of country, obtained a significantly higher mean (29.5) than did the U. S. (18.8). The means for the main effect of ability were: high, 23.5; average, 19.8; and low, 19.8. Figures 25 and 26 graphically illustrate the probable causes for the interactions, respectively, of grade by country and country by ability. The interactions in both cases occurring because of the differences in slope at the respective grade and ability categories when contrasted by country.

Table 22 presents the means for the variables of mechanics of English and spelling for public school pupils in grades one and two on the first testing period. Inspection of Table 22 indicates that in every instance, with one exception, the British Isles means were higher than the U. S. means on these variables. Only at the second grade for low ability was the mean for the U. S. higher than for the British Isles on the variable of mechanics of English. Table 23 presents the F-ratios for the main effects and interactions. The F-ratios for the main effects on the variable of mechanics of English, of grade, ability and country and the interactions of grade by country, grade by ability, and country by ability all were statistically significant. The second grade main effect mean (mechanics of English) 38.0 was significantly higher than the first grade mean (22.7). On the main effect of country the mean for British Isles, 32.8, was significantly higher than the U. S. main effect mean, 28.4. The means for the main effect of ability were: high, 34.0; average, 27.9; and low, 22.6. Figures 27, 28 and 29 present the significant interactions on the variable of mechanics of English. On the grade by country interaction, Figure 27, the cross-over of the U. S. and British Isles means at the second grade undoubtedly was the cause of the interaction. Figure 28, the grade by ability interaction, indicates that the interaction undoubtedly occurred because of the change in relative difference between high, average and low ability first and second-grade pupils with the low ability having less of a difference between first and second grades than was the case at the high and average categories. Figure 29 indicates that the cross-over of U. S. and British Isles means at low ability undoubtedly was the cause of the interaction, as the means of the British Isles high and average ability pupils were higher than the U. S.; the reverse being true at the low ability level.

On the variable of spelling, the main effects of grade and country and ability all were statistically significant beyond the .01 level. The interactions of grade by country and grade by ability and country by ability also were statistically significant. The second grade mean (6.9) was significantly higher than first grade mean (1.7). The British Isles main effect mean (8.3) was significantly higher than the U. S. mean (2.7). The means for the main effect of ability were: high, 5.2; average, 3.5; and low, 2.4. Figures 30, 31, and 32 graphically present the grade by country, grade by ability, and country by ability interactions. In each instance the interaction undoubtedly occurred because of the change in the slope, the relative difference between the means for the respective classifications of grade by country, grade by ability, and country by ability.

Table 24 presents a summary of the significant main effects and interactions of the variables of reading vocabulary, reading comprehension, arithmetic reasoning, arithmetic fundamentals, mechanics of English, and spelling. In each instance on the respective six variables the second grade means were significantly higher than the first grade means. The British Isles means were significantly higher than the U. S. means on each of the variables with the exception of arithmetic reasoning wherein no significant differences between countries appeared. Also significant differences occurred for ability on each of the six variables. Table 24 indicates a large number of significant interactions were present making the interpretation of the significant main effects of grade and country and ability less straight-forward than would be the case were there not significant interactions.

Table 22
Means For English Usage, Mechanics and Spelling, First Testing Period, Grades 1 - 2, Public Schools

Grade	Ability	Mechanics U. S.	Mechanics B. I.	Spelling U. S.	Spelling B. I.
1	High	23.8	37.5	0.6	9.5
	Average	19.4	26.0	0.2	5.7
	Low	17.6	18.2	0.2	2.3
2	High	43.1	43.8	7.6	11.7
	Average	36.7	37.9	5.4	9.5
	Low	30.6	23.1	3.2	9.7

Table 23

F-Ratio of Main Effects And Interactions for Mechanics of English and Spelling, First Testing, Grades 1 - 2, Public Schools

Source of Variation	Degrees of Freedom	Mechanics	Spelling
Grade	1	390.06**	338.50**
Country	1	23.25**	277.69**
Ability	2	60.34**	28.55**
Grade & Country	1	23.17**	7.72**
Grade & Ability	2	3.04*	3.23*
Country & Ability	2	9.12**	6.01**
Grade & Country & Ability	2	1.67	11.85**
Within	497		

* $p < .05$
** $p < .01$

Figure 27
Interaction on Mechanics of English, Grade by Country

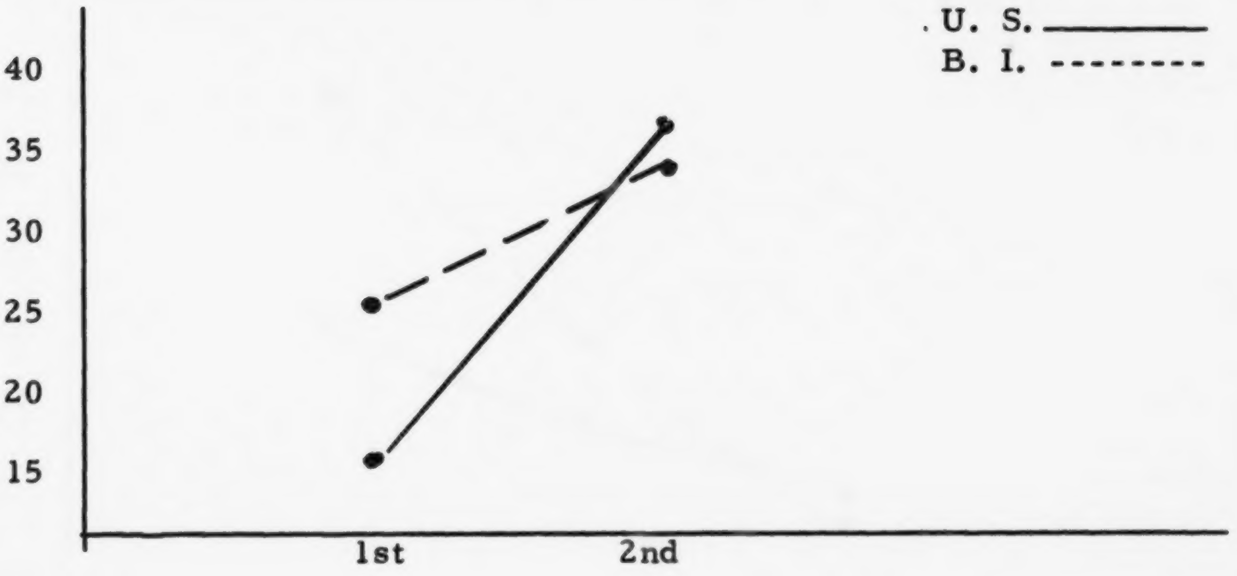


Figure 28
Interaction on Mechanics of English, Grade by Ability

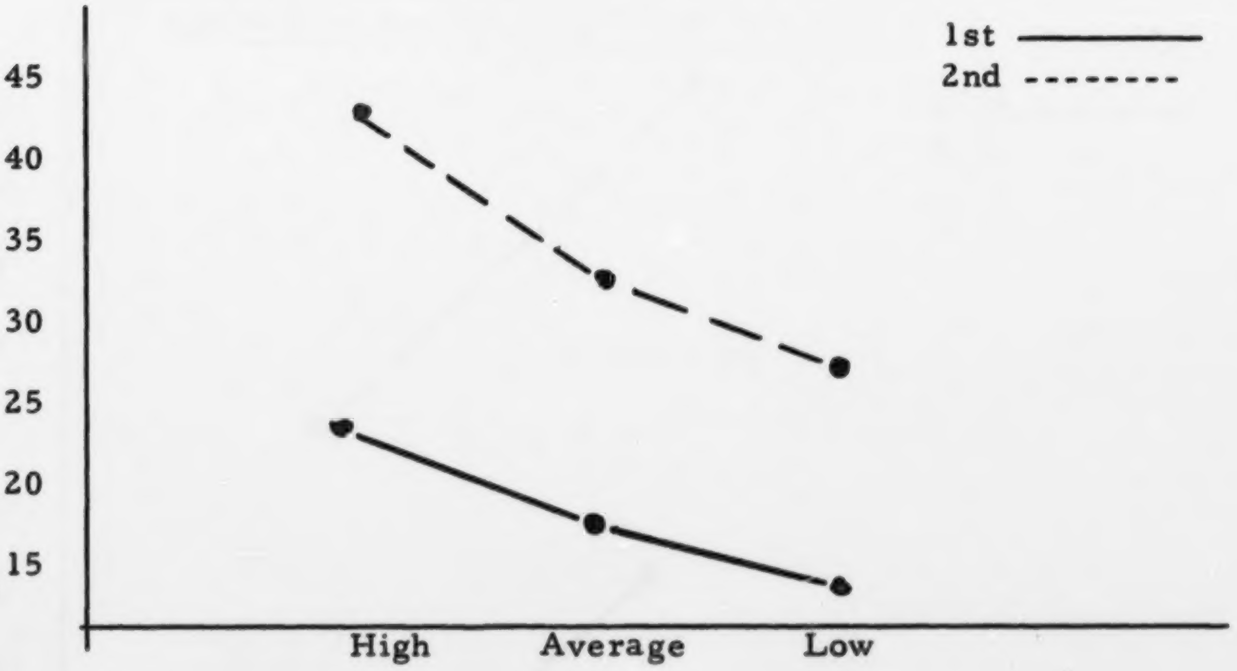


Figure 29

Interaction on Mechanics of English, Country by Ability

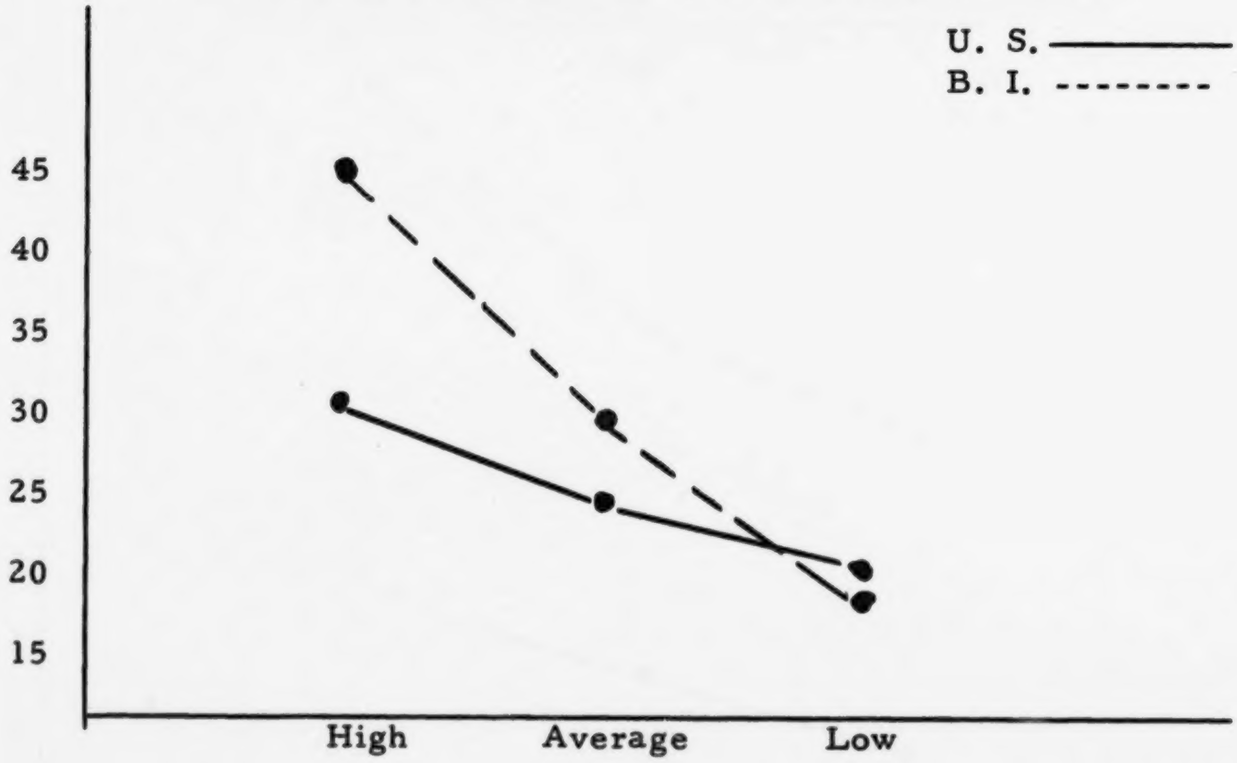


Figure 30

Interaction For Spelling Grade by Country

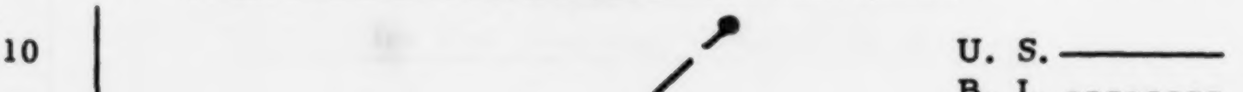


Figure 31

Interaction For Spelling, Grade by Ability

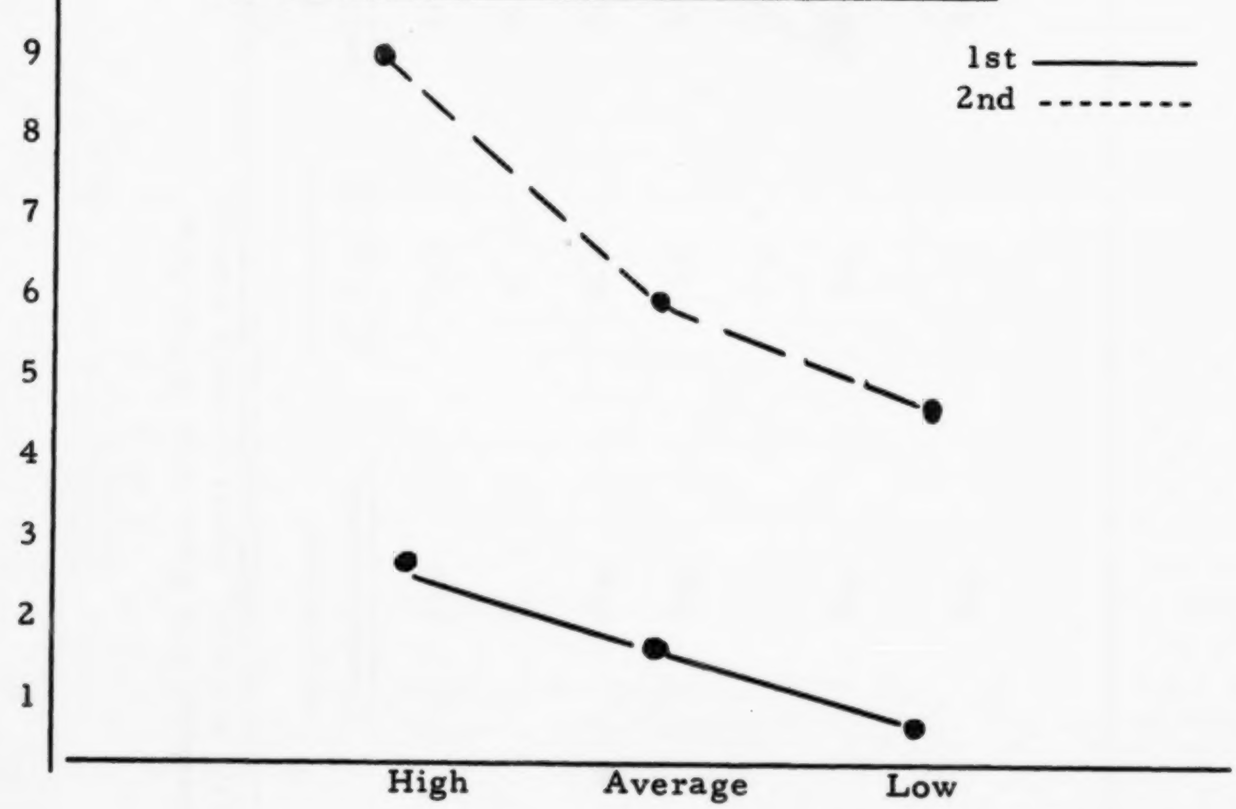


Figure 32

Interaction For Spelling, Country by Ability

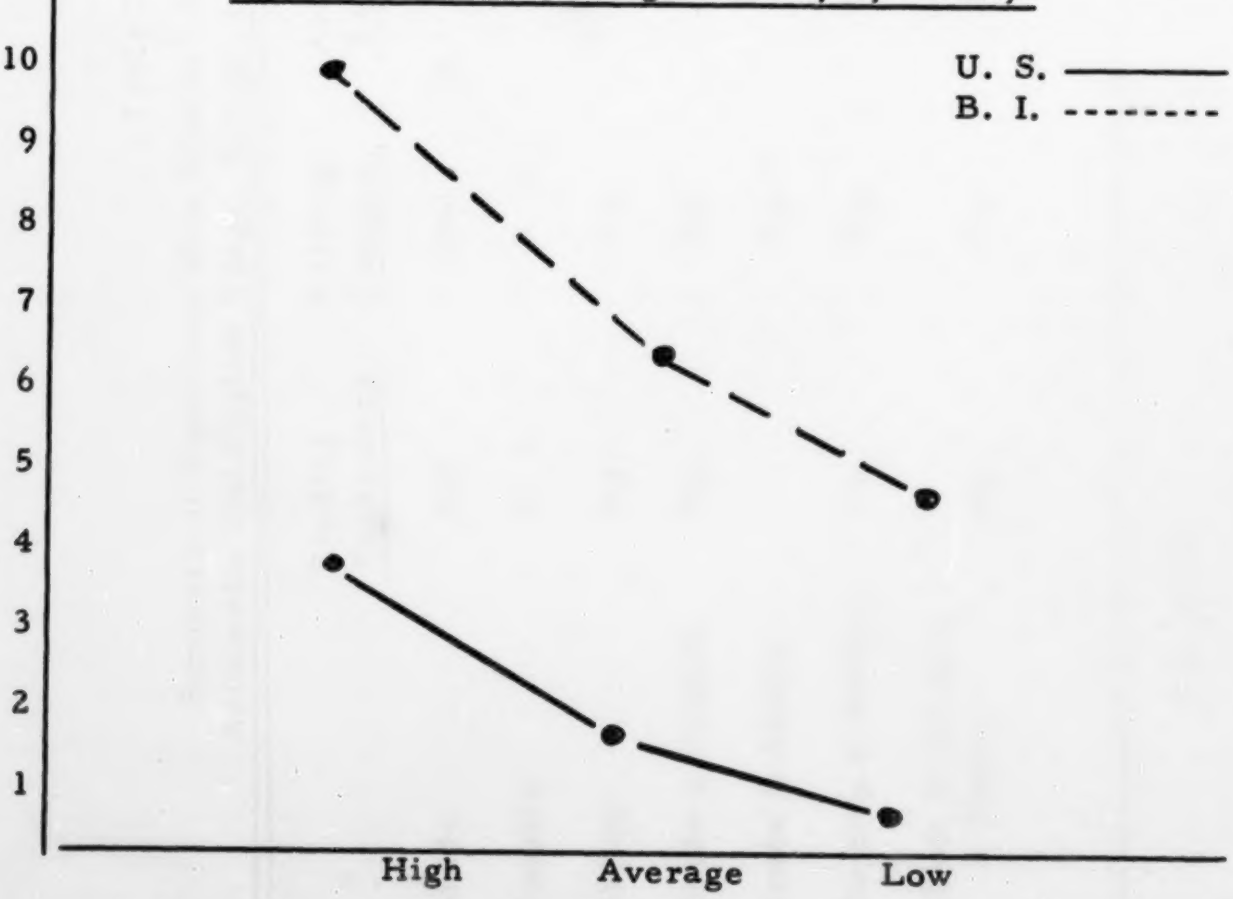


Table 24

Summary of Significant Main Effects[1] And Interactions For Variables of Reading, Arithmetic And English Usage, Grades 1 - 2, Public Schools, First Testing Period

	Reading Vocabulary	Reading Compre.	Arithmetic Reasoning	Arithmetic Fundamentals	Mechanics of English	Spelling
Grade	2nd	2nd	2nd	2nd	2nd	2nd
Country	B. I.	B. I.		B. I.	B. I.	B.I.
Ability	Sig.	Sig.	Sig.	Sig.	Sig.	Sig.
Grade & Country	Sig.	Sig.	Sig.	Sig.	Sig.	Sig.
Grade & Ability		Sig. *			Sig. *	Sig. *
Country & Ability	Sig.	Sig.	Sig.	Sig.	Sig.	Sig.
Grade & Country & Ability	Sig.	Sig.	Sig.	Sig.		Sig.

* p. $<.05$

[1] All main effects are significant at the .01 level except where asterisk denotes .05 level.

(4) Grades Three to Six, Public Schools

Tables 25 through 31 present the results on the variables of reading, arithmetic, and English usage for pupils in grades 3 to 6 of high and average ability located in public schools. The means are derived from the results of the first testing period.

Table 25 presents the means for the variables of reading vocabulary and comprehension. On the reading vocabulary, the British Isles high and average ability pupils in grades three, four, and five obtained higher means than U. S. pupils of similar ability. At the sixth grade the means for high ability U. S. and British Isles pupils were essentially the same. The sixth grade average ability U. S. pupils obtained a higher mean than British Isles average ability pupils. The pattern on the variable of comprehension was not as clear. The means for U. S. third-grade high and average ability, and fifth-grade average ability, and sixth grade high and average ability were higher than British Isles pupils of corresponding ability at the respective grades. In all other instances (both ability, fourth-grade, high ability, fifth-grade) British Isles means were higher than U. S. on this variable.

Table 25
Means For Reading Vocabulary And Comprehension, First Testing Period, Grades 3 - 6, Public Schools

		Vocabulary		Comprehension	
Grade	Ability	U. S.	B. I.	U. S.	B. I.
3	High	22.7	27.3	34.2	29.6
	Average	16.1	23.4	25.1	23.5
4	High	32.3	38.3	43.8	51.2
	Average	23.6	27.1	29.3	32.2
5	High	38.7	42.5	51.2	52.7
	Average	30.2	33.0	38.7	35.0
6	High	44.3	44.0	61.0	55.5
	Average	36.7	35.6	47.6	42.3

Table 26 presents the F-ratios for the main effects and interactions on the variables of reading vocabulary and comprehension. On the variable of reading vocabulary significant F-ratios were obtained for the main effects of grade and country and ability and a significant F-ratio on the interaction of grade by ability, all significant beyond the .01 level. The means for the main effect of grade were: third grade, 19.6; fourth grade, 26.7; fifth grade, 32.9; and sixth grade, 38.0. On the main effect of country, the British Isles mean (32.4) was significantly higher than U. S. (29.7). The high ability main effect mean (37.1) was significantly higher than average ability (28.8). Figure 33 presents the interaction of grade by country. The interaction was the result of the cross-over of the means at the sixth grade. The third grade and fourth grade and fifth grade British Isles means were higher than the U. S. However, at grade six the U. S. mean became the higher.

The F-ratios, on the variable of reading comprehension, as indicated in Table 26, for main effects of grade and country and ability all were significant, as were the interactions of grade by country and grade by ability. The main effect means for grade were: third grade, 26.3; fourth, 33.6; fifth, 40.5; and sixth grade 48.8. The British Isles main effect mean (38.0) was significantly lower than the U. S. mean (39.2). The high ability main effect mean (49.5) was significantly higher than for average ability (35.9).

Table 26

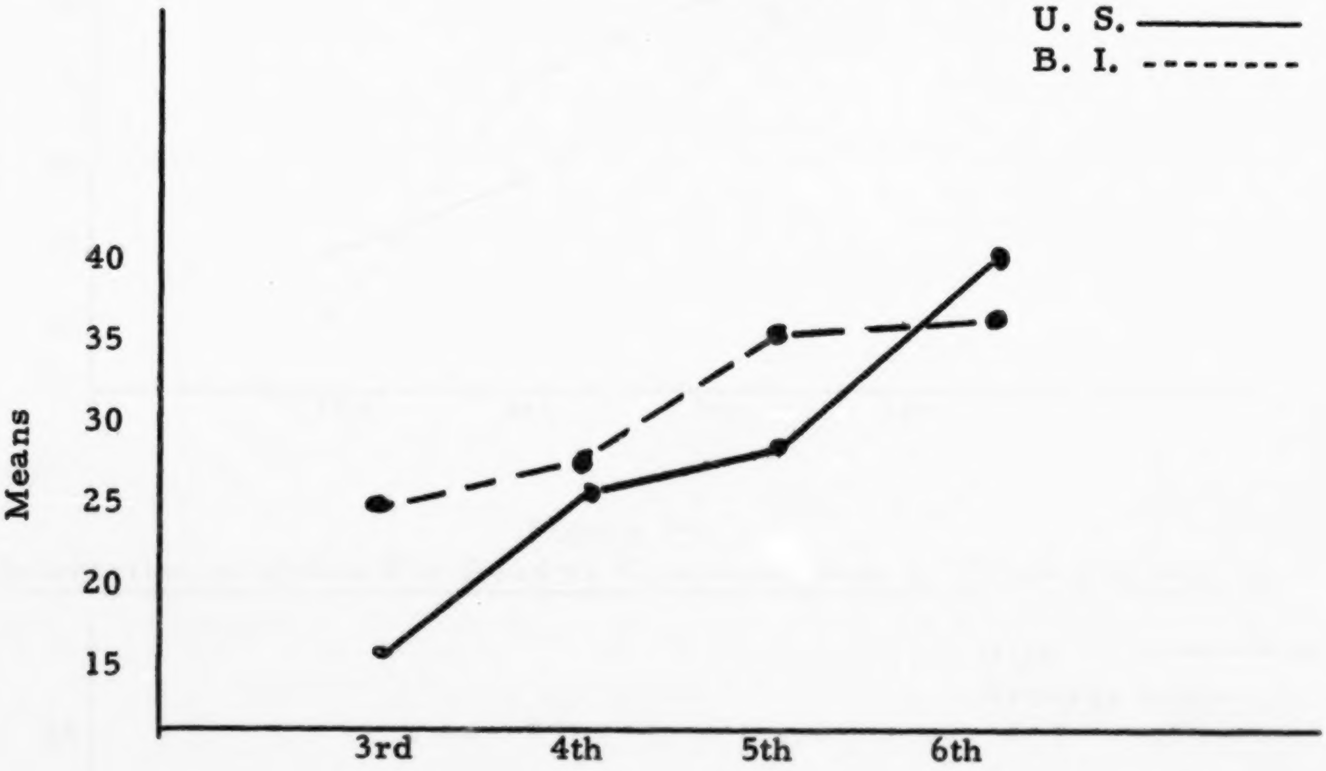
F-Ratios of Main Effects And Interactions For Reading Vocabulary And Comprehension, First Testing Period, Grades 3 - 6, Public Schools

Source of Variation	Degrees of Freedom	Vocabulary	Comprehension
Grade	3	278.09**	255.04**
Country	1	31.64**	3.91**
Ability Level	1	230.48**	365.27**
Grade & Country	3	9.75**	12.53**
Grade & Ability	3	1.40	3.89**
Country & Ability	1	----	2.07
Grade & Country & Ability	3	----	1.28
Within	1083		

** $p < .01$

Figure 33

Interaction of Means For Reading Vocabulary by Grade And Country



Figures 34 and 35 graphically present the interactions of grade and country, and grade and ability, respectively. The grade and country interaction, Figure 34, undoubtedly occurred because of the cross-overs at grades three and six. The interaction of grade and ability, Figure 35, undoubtedly occurred because of the changes in relative mean differences of high and average means at respective grade levels.

Figure 34

Interaction of Means For Reading Comprehension by Grade and Country

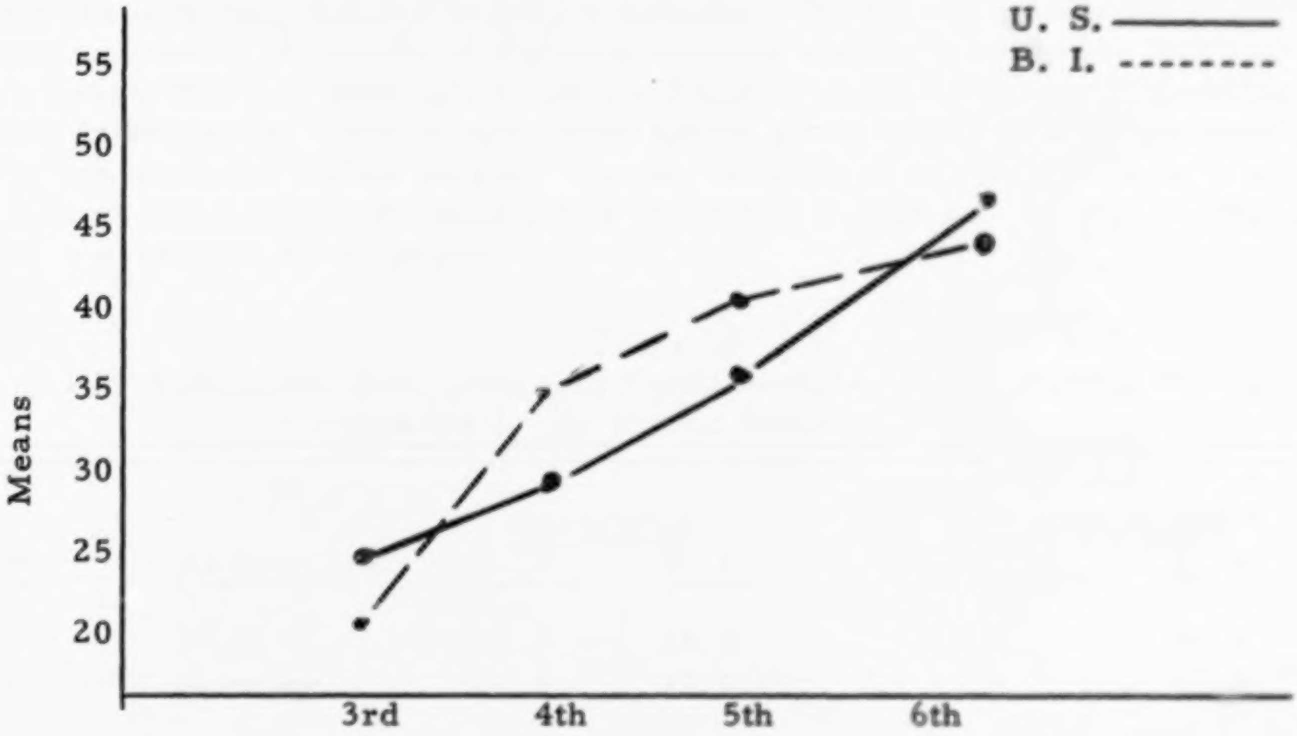


Figure 35

Interaction of Means For Reading Comprehension by Grade and Ability

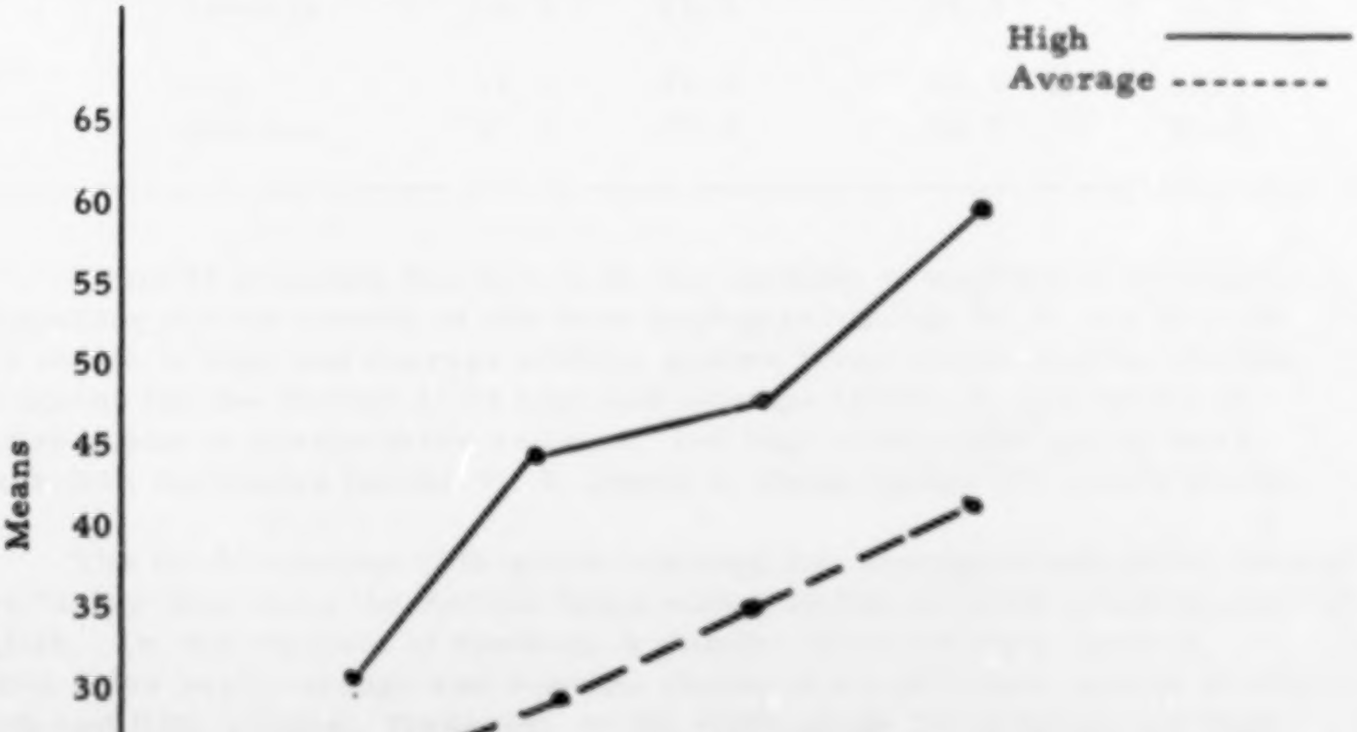


Table 27 presents the means on the variables of arithmetic reasoning and fundamentals, first testing period, for pupils of high and average ability, grades three to six, located in public schools. On the variable of arithmetic reasoning, the U. S. pupils of high and average ability third grade and high and average fifth and sixth grade obtained higher means than corresponding British Isles pupils. The British Isles fourth grade high and average ability pupils achieved the higher means. On the variable of arithmetic fundamentals, the British Isles pupils at every grade level and at both ability levels obtained higher means than U. S. pupils.

Table 27
Means For Arithmetic Reasoning and Fundamentals, First Testing Period, Grades 3 - 6, Public Schools

		Reasoning		Fundamentals	
Grade	Ability	U. S.	B. I.	U. S.	B. I.
3	High	19.0	18.0	14.6	22.6
	Average	13.6	13.2	11.9	19.6
4	High	24.2	29.2	25.4	39.3
	Average	18.8	21.9	21.5	29.0
5	High	30.5	30.2	35.0	43.4
	Average	26.3	23.2	28.9	32.7
6	High	34.0	33.0	44.4	55.1
	Average	30.3	27.3	38.0	42.5

Table 28 presents the means on the variable of mechanics of English and spelling for the results of the first testing period for U. S. and British Isles pupils of high and average ability, grades three to six, public schools. The means for the British Isles high and average ability on mechanics of English pupils in grades three and four, and high ability fifth grade were higher than the means for the U. S. pupils at these ability and grade levels.

The U. S. average fifth-grade and high and average sixth-grade means were higher than were the British Isles means on the variable of mechanics of English. On the variable of spelling, a similar trend existed, namely, British Isles pupils of high and average ability obtained higher means at third, fourth and fifth-grades. However, at the sixth-grade for average and high ability, the U. S. pupils obtained higher means than British Isles pupils.

Table 28
Means For Mechanics of English And Spelling, First Testing Period, Grades 3 - 6, Public Schools

Grade	Ability	Mechanics U. S.	Mechanics B. I.	Spelling U. S.	Spelling B. I.
3	High	44.1	44.3	10.5	14.6
	Average	33.7	36.6	7.8	12.4
4	High	66.1	76.2	17.1	22.1
	Average	48.2	58.1	12.8	16.1
5	High	77.0	80.1	20.8	23.5
	Average	65.6	56.0	16.9	19.0
6	High	92.3	86.7	24.4	23.8
	Average	77.1	65.4	20.6	20.0

Table 29 presents the F-ratios for the variables of arithmetic reasoning and fundamentals. On the variable of arithmetic reasoning, significant F-ratios were obtained for grade and ability level and significant grade by country and country by ability interactions. The main effect of country was not statistically significant. The main effect means for grade were: third, 14.6; fourth, 21.0; fifth, 26.4; and sixth grade, 30.2. The high ability main effect mean (28.2) was significantly higher than the average ability (23.0) mean. Figures 36 and 37 present the interactions of grade and country and country by ability. The grade and country interaction, Figure 36, occurred because of the cross-over of U. S. and British Isles means from grade three to four wherein the U. S. mean was higher than British Isles mean grade three which reversed at grade four, crossed-over again at grade five, with U. S. mean being higher at this grade as well as the higher mean at grade six. The country by ability interaction, Figure 37, occurred because of the change-over of high and average ability U. S. and British Isles means, wherein the high British Isles mean was not maintained at average ability wherein the U. S. mean was higher than the British Isles mean.

On the variable of arithmetic fundamentals, the F-ratios for main effects of grade, country and ability level were significant beyond the .01 level. The grade by country and country by ability interactions also were significant. The main effect means for grade were: third grade, 14.9; fourth grade, 25.1; fifth grade, 31.7; and sixth grade, 41.2. The British Isles main effect mean (34.9) was significantly higher than U. S. (27.9). The high ability main effect mean (35.4) was significantly higher than for average ability (28.7). Figures 38 and 39 graphically illustrate the grade by ability and country by ability interactions.

Table 29

F-Ratios of Main Effects And Interactions For Arithmetic Reasoning And Fundamentals, First Testing Period, Grades 3 - 6, Public Schools

Source of Variation	Degrees of Freedom	Reasoning	Fundamentals
Grade	3	412.24**	544.44**
Country	1	------	210.03**
Ability Level	1	186.62**	147.51*
Grade & Country	3	21.87**	2.40
Grade & Ability	3	------	3.42*
Country & Ability	1	4.42*	15.99**
Grade & Country & Ability	3	------	1.33
Within	1083		

* p <.05
** p <.01

Figure 36
Interaction of Means For Arithmetic Reasoning by Grade and Country

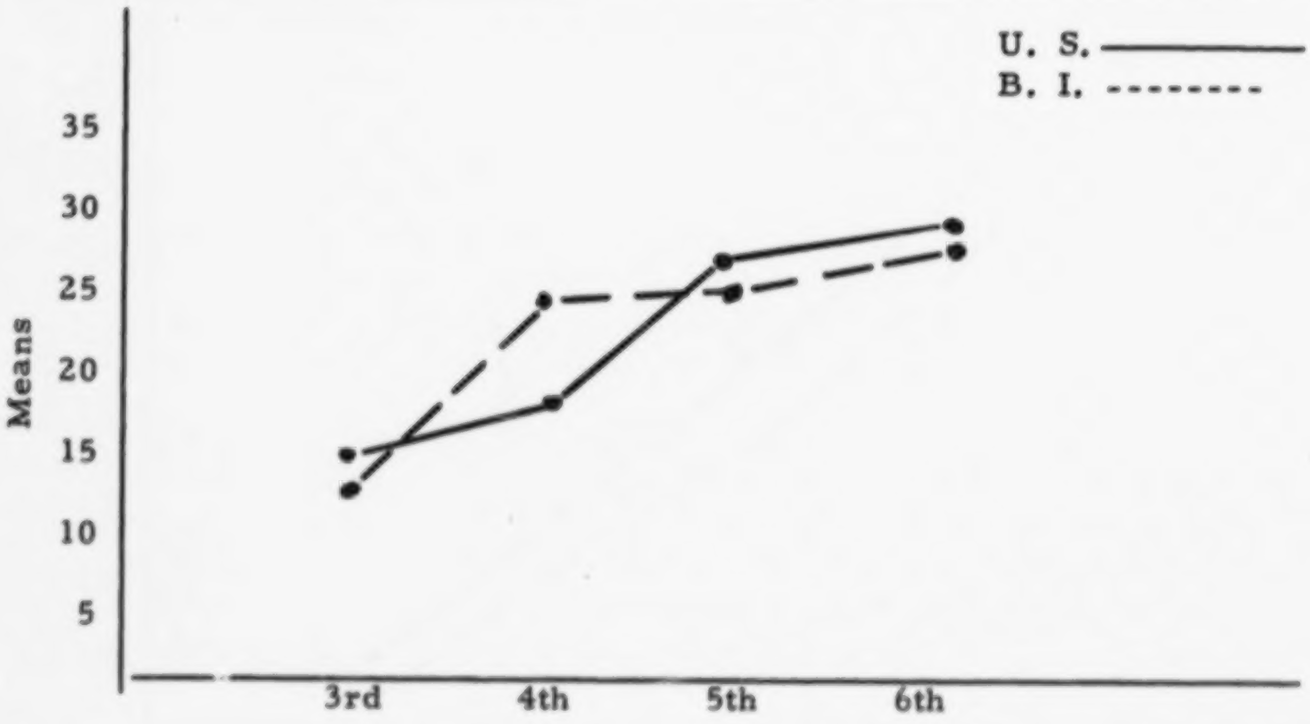


Figure 37
Interaction of Means for Arithmetic Reasoning by Country and Ability

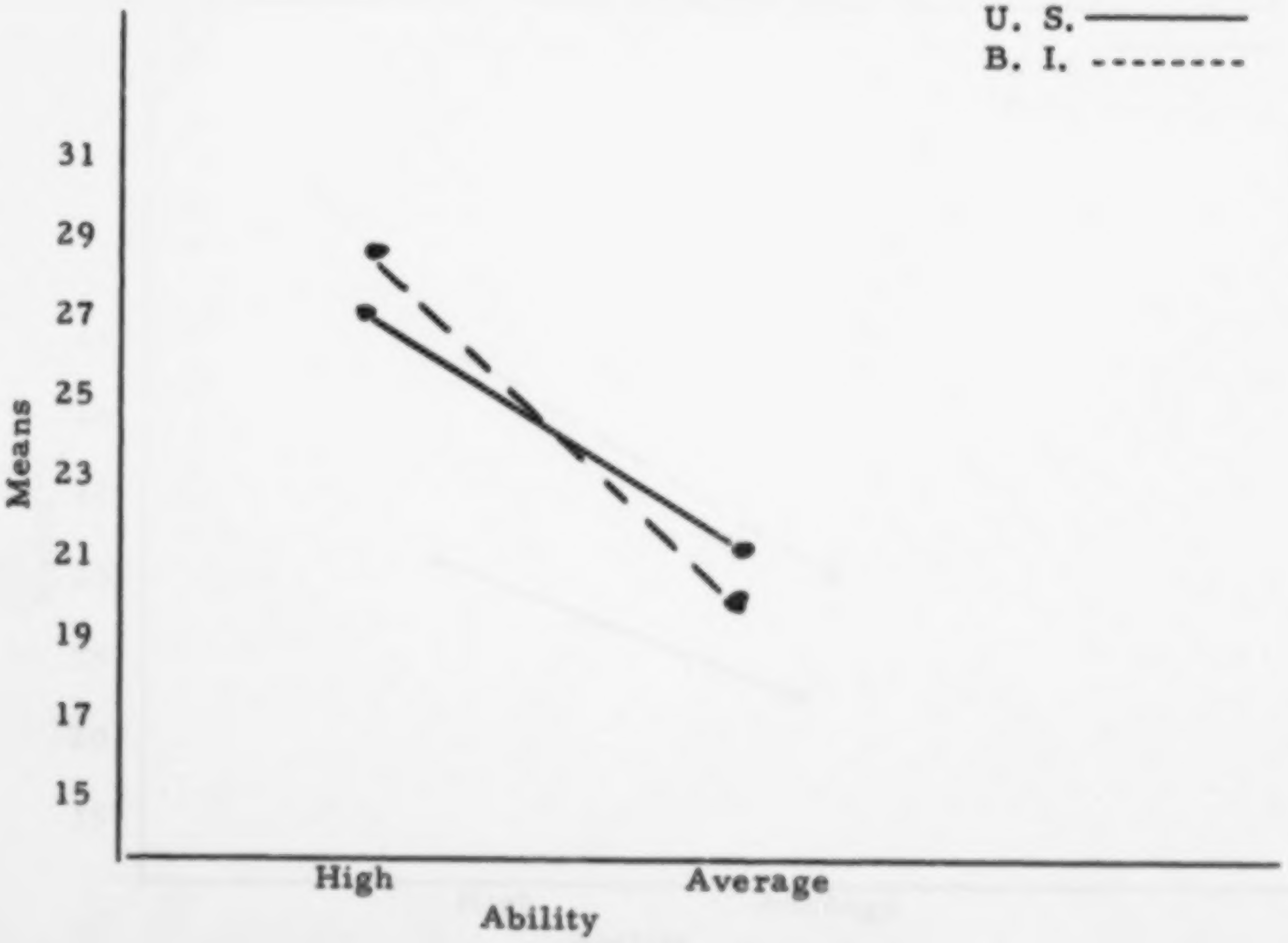


Figure 38

Interaction of Means For Arithmetic Fundamentals by Grade and Ability

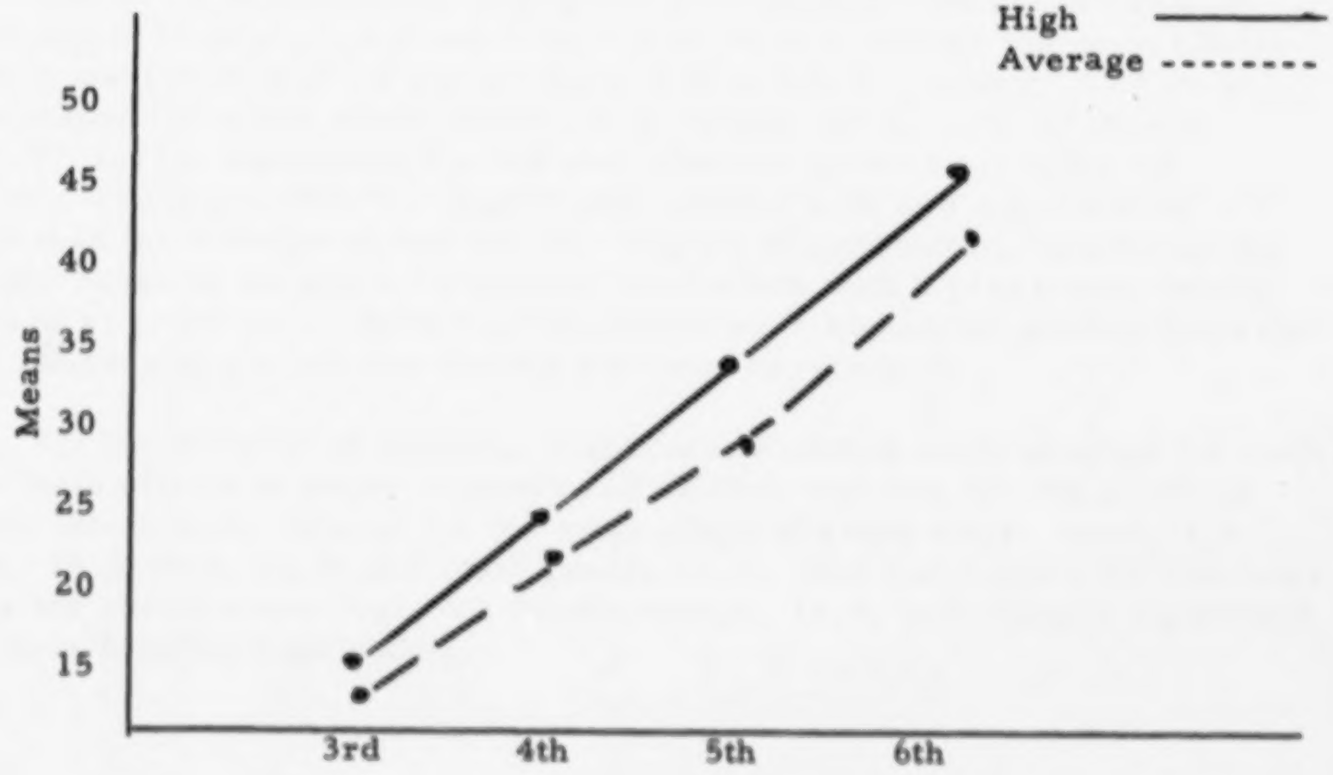


Figure 39

Interaction of Means For Arithmetic Fundamentals by Country and Ability

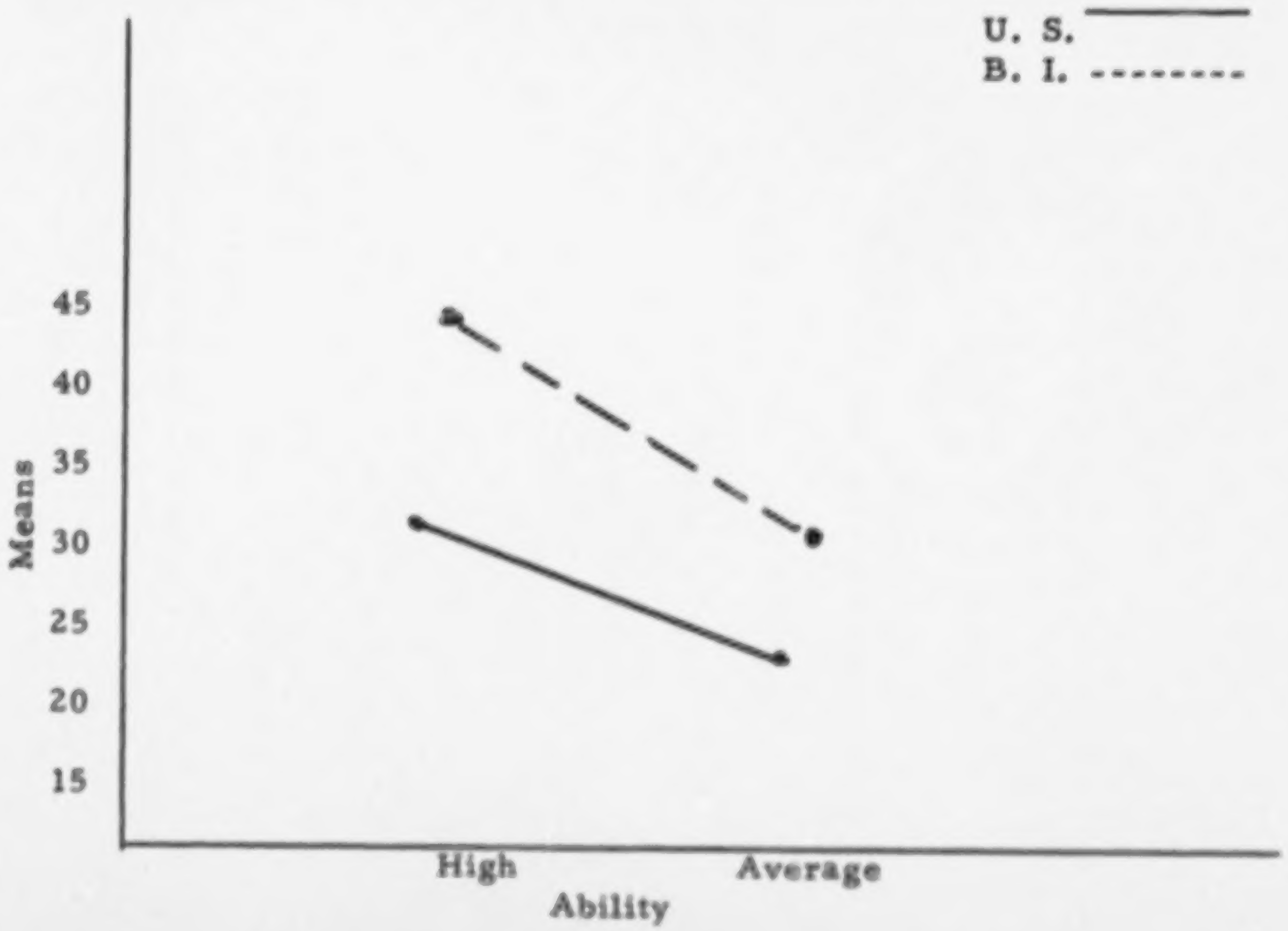


Table 30 presents the F-ratios for the main effects and interactions for the variables of mechanics of English and spelling. On the variable of mechanics of English significant F-ratios were obtained for the main effects of grade and ability and for the interaction of grade by country. The main effect means for grade were: third, 36.6; fourth, 55.0; fifth, 65.8; and sixth, 77.1. No significant F-ratio was obtained on the main effect of country. The main effect for high ability mean (74.2) was significantly higher than for average ability (58.2). Figure 40 graphically illustrates the probable cause of the grade by country interaction with a cross-over having occurred at grade five. British Isles means were higher for grades three and four, whereas at grades five and six the reverse was true.

On the variable of spelling, significant F-ratios were obtained for each of the main effects of grade, country and ability, and also for the grade by country interaction. Means for the main effect of grade were: third, 9.8; fourth, 14.8; fifth, 18.4; and sixth grade, 21.2. The main effect British Isles means for ability were: high, 20.0 and average, 16.0, indicating a significant difference favoring high ability.

Table 30
F-Ratios of Main Effects And Interactions For Mechanics of English and Spelling, First Testing Period, Grades 3 - 6, Public Schools

Source of Variation	Degrees of Freedom	Mechanics	Spelling
Grade	3	118.55**	233.14**
Country	1	------	46.22**
Ability	1	81.19**	121.43**
Grade & Country	3	10.63**	12.76**
Grade & Ability	3	-----	1.28
Country & Ability	1	1.23	------
Grade & Country & Ability	3	-----	------
Within	1083		

** $p < .01$

Figure 40
Interaction of Means For Mechanics of English by Grade And Country

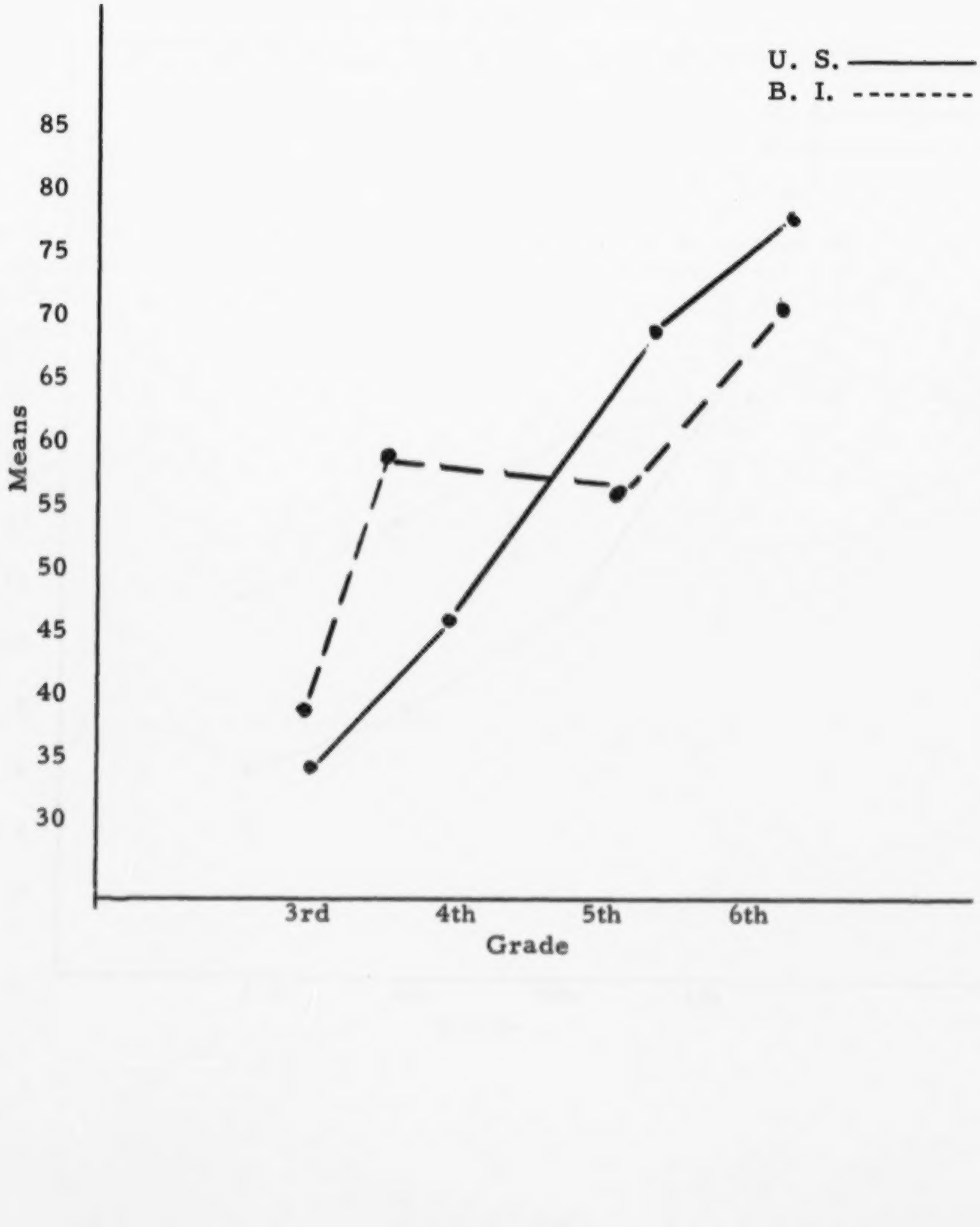


Figure 41 graphically presents the possible cause for the grade by country interaction on spelling; the interaction occurring because of the cross-over of means at sixth grade with the U. S. mean higher than British Isles mean, whereas at grades three, four and five the reverse was the case.

Figure 41
Interaction of Means For Spelling by Grade And Country

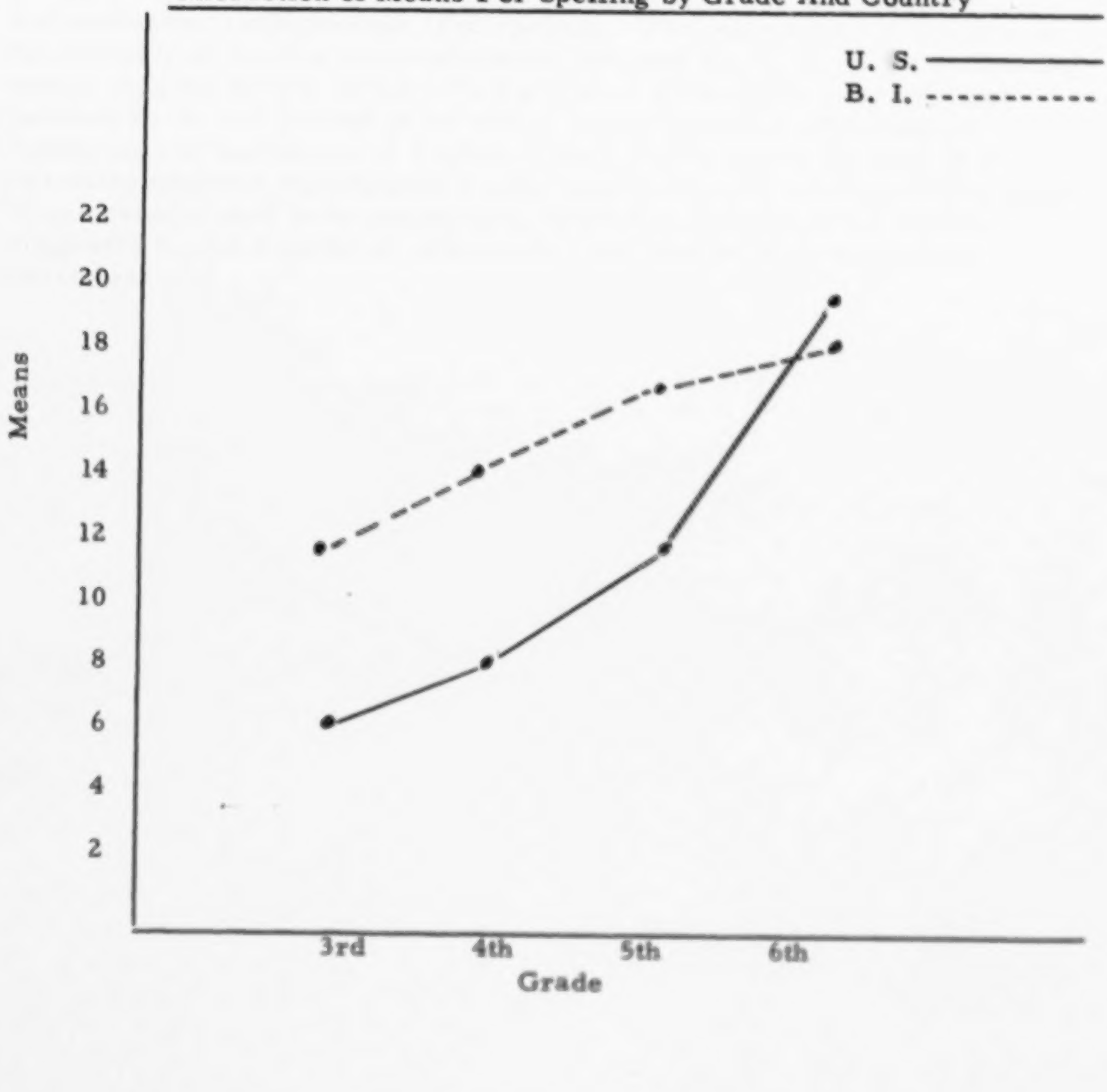


Table 31 presents a summary of the significant F-ratios that were obtained for the main effects and interactions on the variables of reading, arithmetic, and English usage for pupils in grades three to six enrolled in public schools on the first testing period results. Significant main effect of grade was obtained on each of the six variables. Significant differences were obtained between countries on four of the variables with the exception of arithmetic reasoning and mechanics of English; British Isles pupils obtained significantly higher means on the variables of reading vocabulary and arithmetic fundamentals, and spelling. The main effect of country on the variable of reading comprehension indicated the U. S. was significantly higher than the British Isles. No significant differences were obtained between U. S. and British Isles means on the variables of arithmetic reasoning and mechanics of English. High ability pupils on each of the six variables obtained significantly higher means than did average ability pupils. These results need to be interpreted, however, in light of the caution suggested by the significant interactions that occurred on each of the variables.

Table 31

Summary of Significant Main Effects[1] And Interactions For Variables of Reading, Arithmetic And English Usage, Grades 3 - 6, Public Schools, First Testing Period

	Reading Vocabulary	Reading Compre.	Arithmetic Reasoning	Arithmetic Fundamentals	Mechanics of English	Spelling
Grade	Sig.	Sig.	Sig.	Sig.	Sig.	Sig.
Country	B. I.	U. S.		B. I.		B. I.
Ability	H	H	H	H	H	H
Grade & Country	Sig.	Sig.	Sig.		Sig.	Sig.
Grade & Ability		Sig.		Sig.*		
Country & Ability			Sig.	Sig.		
Grade & Country & Ability						

* $p < .05$

[1] All F-ratios are significant at the .01 level except where asterisk denotes .05 level.

(5) Summary of Results--First Testing Period

The analysis of the results of the first testing period, revealed significant differences on the main effects of grade and country and ability and, in some instances, on varied interactions of these main effects. On every variable-reading vocabulary, reading comprehension, arithmetic reasoning, arithmetic fundamentals, mechanics of English, and spelling, significant differences were obtained on the main effect of grade. On the variables of reading vocabulary, reading comprehension, and arithmetic fundamentals and spelling, in grades one and two, and arithmetic fundamentals and spelling grades three to six, British private school pupils obtained higher means than U. S. private school pupils at corresponding grade levels. Only on the variables of reading comprehension, arithmetic reasoning, and mechanics of English in grades three to six did the U. S. obtain significantly higher means than the British Isles pupils. No significant differences existed between the means between country on the variables of arithmetic reasoning and mechanics of English in grades one and two, and reading vocabulary in grades three to six. In every instance at all grade levels and for each variable the high ability pupils obtained significantly higher means than did average ability pupils. Reference to Summary Tables 10 and 17 indicated that significant interactions did occur at grades one and two for the variables of reading vocabulary and arithmetic fundamentals necessitating caution in interpreting the significant main effects for these variables. No other interactions were significant for the main effects at these grades. However, significant interactions occurred in grades three to six, private schools, on the variables of reading vocabulary, reading comprehension, arithmetic reasoning, and mechanics of English. Only on the variables of arithmetic fundamentals and spelling did significant interactions not occur. Therefore, the significant differences that were obtained on the main effects must be interpreted with the caution suggested by occurrence of the significance of the interactions.

A very similar pattern existed in the results obtained from pupils in grades one to six in public schools. In each instance across all six variables significant F-ratios were obtained on the main effects of grade and ability. In reference to the major concern of the study the differences that occurred for the main effect of country-significant differences were obtained on the variables of reading vocabulary, reading comprehension, arithmetic fundamentals, mechanics of English, and spelling for pupils in grades one to two. In every instance British Isles main effect means were significantly higher for grades one and two. Only on the variable of arithmetic reasoning did no significant differences occur. At grades three to six the British Isles were significantly higher on the variables of reading vocabulary, arithmetic fundamentals and spelling. Only on the variable of reading comprehension did the U. S. obtain a significantly higher mean for grades three to six. On the variables of arithmetic reasoning and mechanics of English no significant differences occurred. Reference to Tables 24 and 31 would indicate the caution that need be taken in the interpretation of these significant main effects where interactions for the main effects did occur. Therefore, in summary, the British Isles were significantly higher than the U. S. on several of the variables in both private and public schools at both grade categories one to two and three to six. The U. S. obtained significantly higher means on the variables of reading comprehension, arithmetic reasoning, and mechanics of English in private schools grades three to six; and in one instance, on the variable of reading comprehension, for public schools, grades three to six. No significant differences occurred in private schools grades one to two on the variables of arithmetic reasoning and mechanics of English; and reading vocabulary, grades three to six private schools. No significant differences was obtained at grades one to two public schools on the variable of arithmetic reasoning; and grades three to six public schools on the variables of arithmetic reasoning and mechanics of English.

B. Results of Mid-year And Final Testing Periods

This section reports the results of pupil achievement at mid-year and end-of-year on the variables of reading-vocabulary and comprehension; arithmetic-reasoning and fundamentals; and English usage-mechanics of English and spelling. The results will be analyzed separately for public and private schools and grades one and two and grades three to six. A factorial analysis of covariance was employed to analyze the data. It should be recalled from the discussion on statistical techniques and appropriate interpretations, that the covariant, which is held constant, were the pupils mid-year test scores. This technique allowed the identifying of specific periods at which significant differences might occur for pupils in the categories of varying ability levels, in public and private schools, and of differing grade levels. The covariance of analysis, in this instance, essentially is an analysis of gains that respective students had made from mid-year to final test periods. The interpretation of the results for this section will be facilitated by the presentation of data in three forms; (1) presentation of mid-year and final-test means for the respective variables of reading, arithmetic, and English usage, (2) the F-ratios from the analysis of covariance--the F-ratios based upon adjusted means, adjusted for mid-year scores, thereby interpreted as being a gain from mid-year to end of year, and (3) data presentation by graph to assist the reader in interpreting interactions of the main effects of grade and country and ability wherever the interactions occurred.

(1) Private Schools, Grades 1 and 2

Table 32 presents the mid-year and final test means on the variables of reading vocabulary and comprehension for pupils in grade one and two located in private schools for the U. S. and British Isles sample. Inspection of Table 32, for the variable of reading vocabulary, indicated that British Isles pupils in both grades one and two and of high and average ability obtained higher means at both mid-year and final-test period than did the U. S. pupils with the lone exception of second grade high-ability pupils at mid-year wherein the means obtained were essentially the same for U. S. and British Isles for this category.

Table 33 contains the F-ratios for main effects and interactions on the variables of reading vocabulary and comprehension. On the variable of reading vocabulary, no significant F-ratios were obtained on the main effects of grade or country indicating that no significant gains were made between grades one and two and between U. S. and British Isles pupils on this variable. However, significant F-ratios were obtained for the main effect of ability and the interactions of grade by country and grade by ability. The adjusted means for the main effect of ability were: high ability, 66. 1 and average ability, 64. 1, indicating a significant difference in gain favoring high ability pupils.

Table 32
Mid-Year And Final-Test Means For Reading Vocabulary And Comprehension
Grades 1 - 2, Private Schools

		Vocabulary				Comprehension			
		U. S.		Br. Is.		U. S.		Br. Is.	
Grade	Ability	Mid-Yr.	Final	Mid-Yr.	Final	Mid-Yr.	Final	Mid-Yr.	Final
1	High	54. 1	65. 2	68. 7	71. 0	9. 5	11. 8	10. 8	13. 0
	Average	46. 9	55. 5	52. 1	57. 1	6. 8	9. 3	4. 9	7. 3
2	High	69. 8	70. 7	69. 3	71. 2	13. 5	14. 2	11. 7	13. 6
	Average	62. 5	65. 9	64. 8	68. 3	11. 9	12. 1	9. 0	11. 1

Table 33

F -Ratios From The Analysis of Covariance, Reading Vocabulary, And Comprehension Private Schools, Grades 1 - 2

Source of Variation	Degrees of Freedom	Reading	
		Vocabulary	Comprehension
Grade	1	1.81	---
Country	1	1.18	---
Ability	1	4.79*	5.01*
Grade & Country	1	4.06*	---
Grade & Ability	1	6.70*	---
Country & Ability	1	---	---
Grade & Country & Ability	1	---	---
Within	111		

*$p < .05$

Figure 42 graphically presents the probable cause of the interaction of grade by country wherein first-grade United States pupils, on the variable of reading vocabulary, obtained higher adjusted means than did B. I. pupils in grade one, whereas the reverse is true at grade two, namely, the B. I. adjusted mean was the higher.

Figure 42
Interaction of Means For Reading Vocabulary by Grade And Country

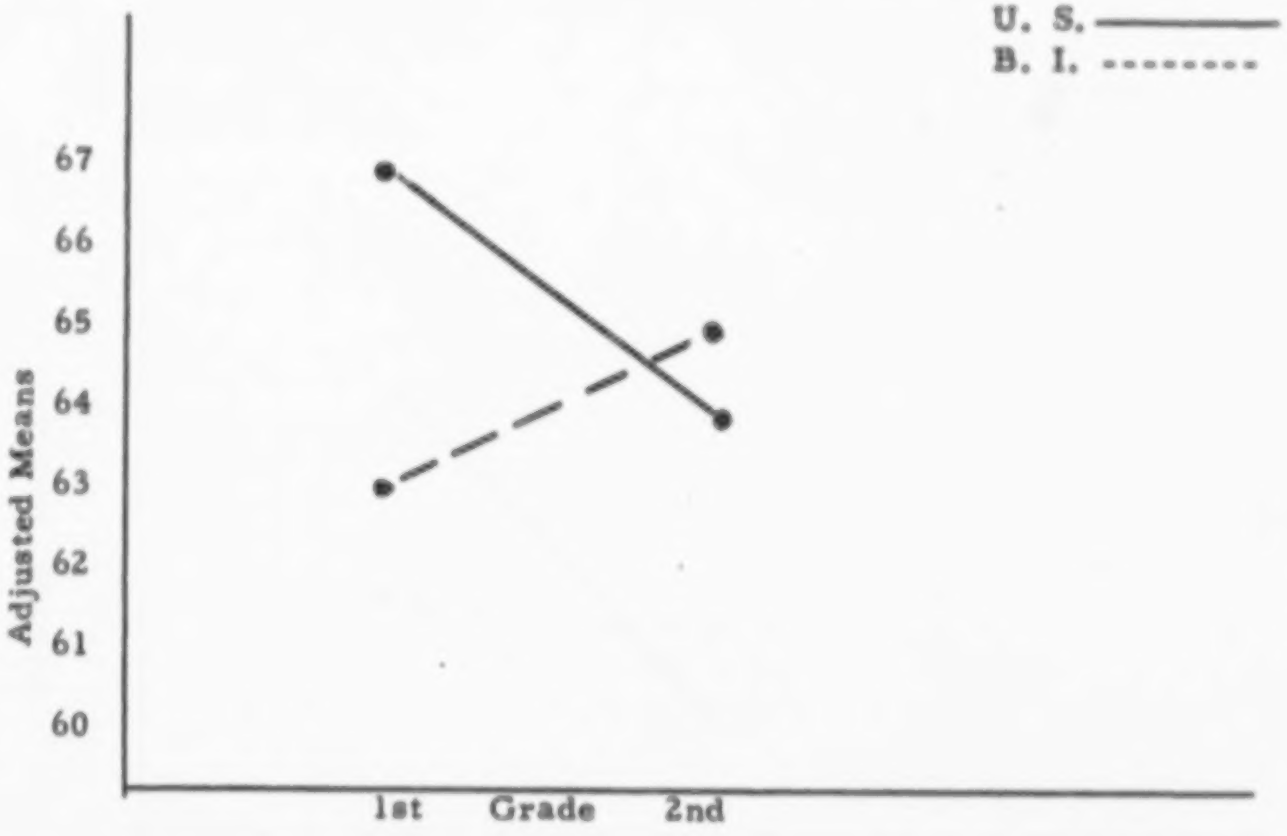
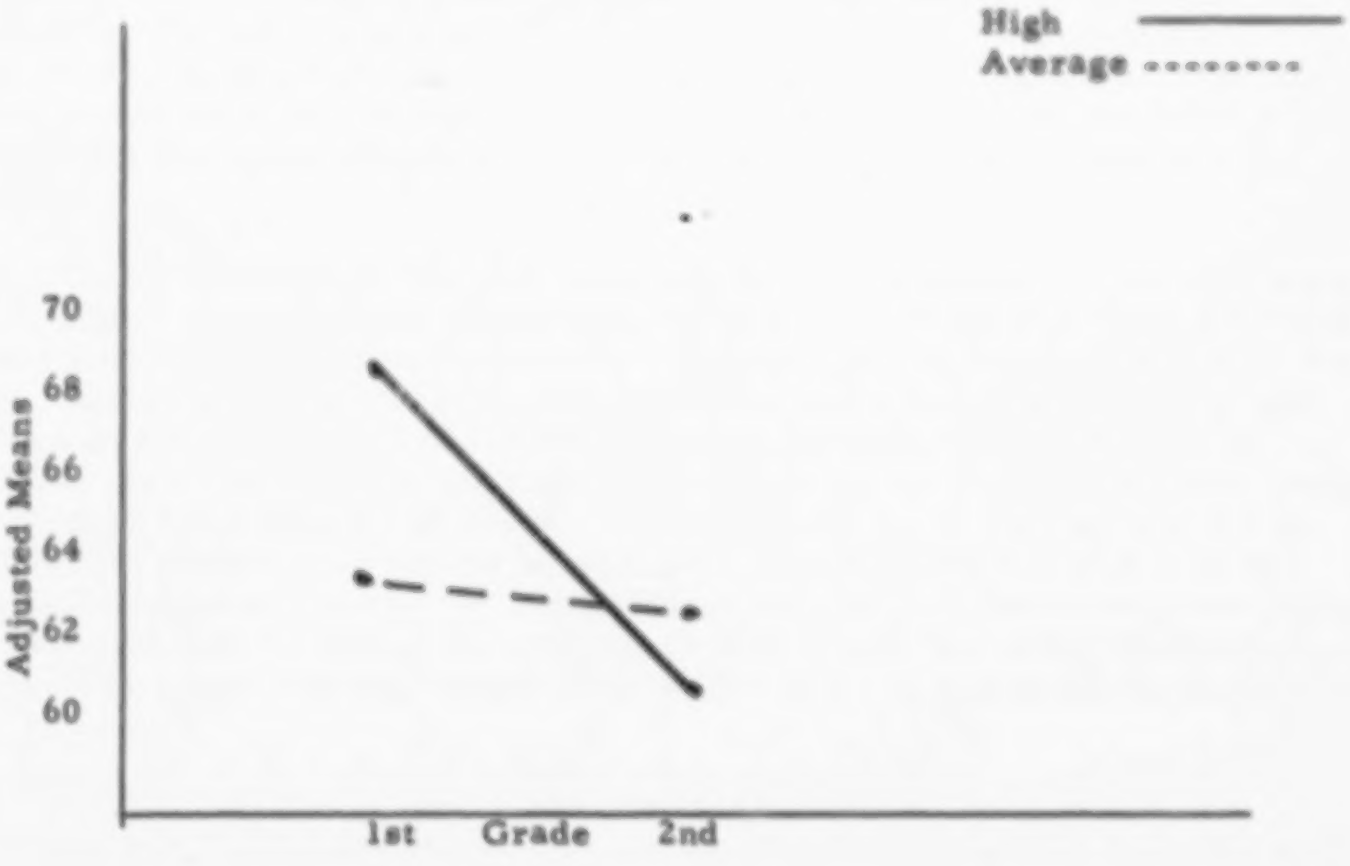


Figure 43 graphically presents the probable cause of the interaction of grade by ability on the variable of reading vocabulary. The adjusted mean of high ability pupils at grade one was higher than the average ability grade one pupils; however, at second grade the high ability pupils did not maintain their position relative to average ability pupils wherein the adjusted mean for average ability was higher than for high ability.

Figure 43

Interaction of Means For Reading Vocabulary by Grade And Ability



The pattern that was present for the variable of reading vocabulary was not maintained on the variable of reading comprehension, as reported in Table 32. The mid-year means for U. S. pupils of average ability-first-grade, and high and average second-grade obtained higher means than did British Isles pupils of corresponding ability and grade level, the lone exception being for first grade high ability pupils wherein the British Isles mean was higher than the U. S. mid-year mean as well as was the case for high ability first-graders on the final test mean. The final-test means for first-grade average ability pupils and second-grade high and average ability pupils were higher for the U. S. than British Isles on the variable of reading comprehension for pupils in private schools. Table 33 also contains the F-ratios for the variable of reading comprehension. A significant F-ratio, 5.01, was obtained for the main effect of ability, the adjusted means for ability being: high, 12.2, and average, 11.1, indicating a significantly higher gain for high ability pupils than for average ability pupils. Significant F-ratios were not obtained for the main effects of grade and country nor were any interactions significant.

Table 34 presents the mid-year and final-test means for the variables of arithmetic reasoning and fundamentals for U. S. and British Isles first and second grade pupils in private schools. Reasoning: On the variable of arithmetic reasoning, the pattern for mid-year and final-test means for high and average pupils in grades one and two presents a fluctuating pattern. The mean for the U. S. first-grade high and average pupils at mid-year was lower than British Isles means, whereas at mid-year the U. S. second-grade high and average ability pupil means were higher than for British Isles. On the final-test period the means for British Isles were higher for first-grade high ability pupils and second-grade average ability pupils; the mean for average ability first-grade and high ability second-grade being higher for U. S. pupils.

Table 34
Mid-Year And Final Test Means For Arithmetic Reasoning And Fundamentals
Grades 1 - 2, Private Schools

		Reasoning				Fundamentals			
		U. S.		B. Is.		U. S.		Br. Is.	
Grade	Ability	Mid-Yr.	Final	Mid-Yr.	Final	Mid-Yr.	Final	Mid-Yr.	Final
1	High	29.5	34.6	34.9	37.8	31.5	36.6	38.2	41.2
	Average	25.3	31.5	27.1	29.8	22.3	33.7	30.2	32.0
2	High	39.1	40.9	37.0	38.3	41.1	42.0	42.2	43.0
	Average	34.4	35.6	32.9	38.2	38.3	40.7	39.7	40.7

Table 35
F-Ratios From Analysis of Covariance, Arithmetic Reasoning, 2nd Fundamentals
Private Schools, Grades 1 - 2

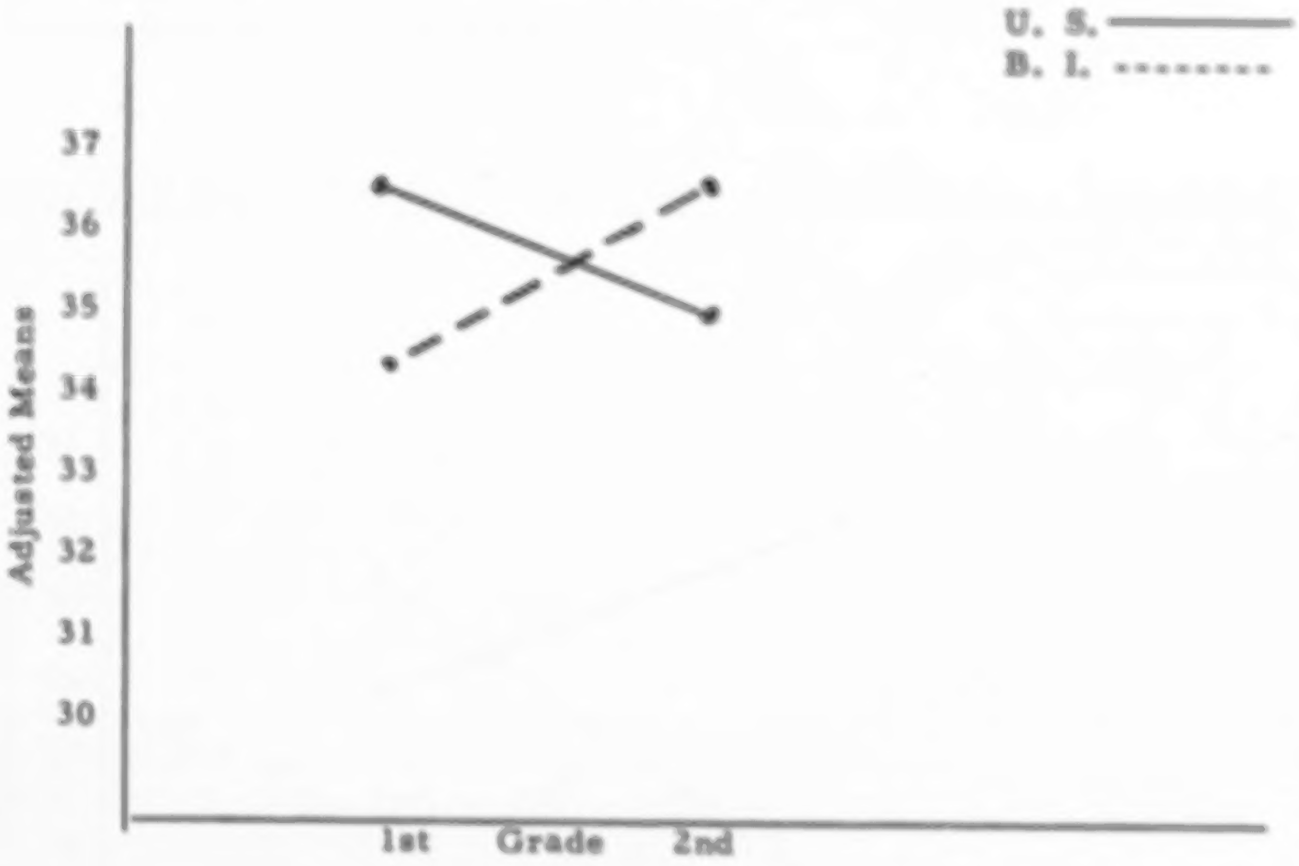
Source of Variation	Degrees of Freedom	Reasoning	Fundamentals
Grade	1	------	1.99
Country	1	------	----
Ability	1	1.20	----
Grade & Country	1	3.54*	----
Grade & Ability	1	------	----
Country & Ability	1	------	6.37*
Grade & Country & Ability	1	5.59*	3.10
Within	111		

* $p < .05$

Table 35 presents the F-ratios for the variables of arithmetic reasoning and fundamentals. On arithmetic reasoning, no significant F-ratios were obtained for the main effects of grade, country, or ability. A significant F-ratio, 3.54, was obtained for the interaction of grade by country. Figure 44 graphically presents the probable cause of this interaction. The adjusted first-grade U. S. mean was higher than British Isles adjusted first-grade mean whereas a cross-over occurred at grade two wherein the second-grade British Isles adjusted mean was higher than U. S. adjusted mean. Table 35 indicates that a significant second order interaction of grade by country and by ability was also present. However, it should be recalled that an interpretation of the second-order interactions will not be made.

Figure 44

Interaction of Means For Arithmetic Reasoning by Grade And Country



The mid-year and final-test means for the variable of arithmetic fundamentals are also contained in Table 34. The mid-year U. S. means for high and average pupils in both grades one and two were lower than British Isles means for pupils of similar categories. The final U. S. mean for high ability first-grade and second-grade pupils was lower than British Isles high ability first-and second-grade pupils. The mean for U. S. pupils of average ability, first grade, was higher than British Isles first-grade average ability pupils; the mean for average second-grade pupils was the same as the British Isles average ability mean. The F-ratios for the variable of arithmetic fundamentals are reported in Table 35. No significant F-ratios were obtained for the main effects of grade, country or ability. The only significant F-ratio obtained was for the interaction of country by ability. Figure 45 presents graphically the probable cause of the obtained significant interaction. The adjusted British Isles high ability mean was higher than the U. S. high ability adjusted mean whereas this relationship was not obtained for average ability pupils; the U. S. average ability adjusted mean was higher than British Isles average adjusted mean.

Figure 45

Interaction of Means For Arithmetic Fundamentals by Country And Ability

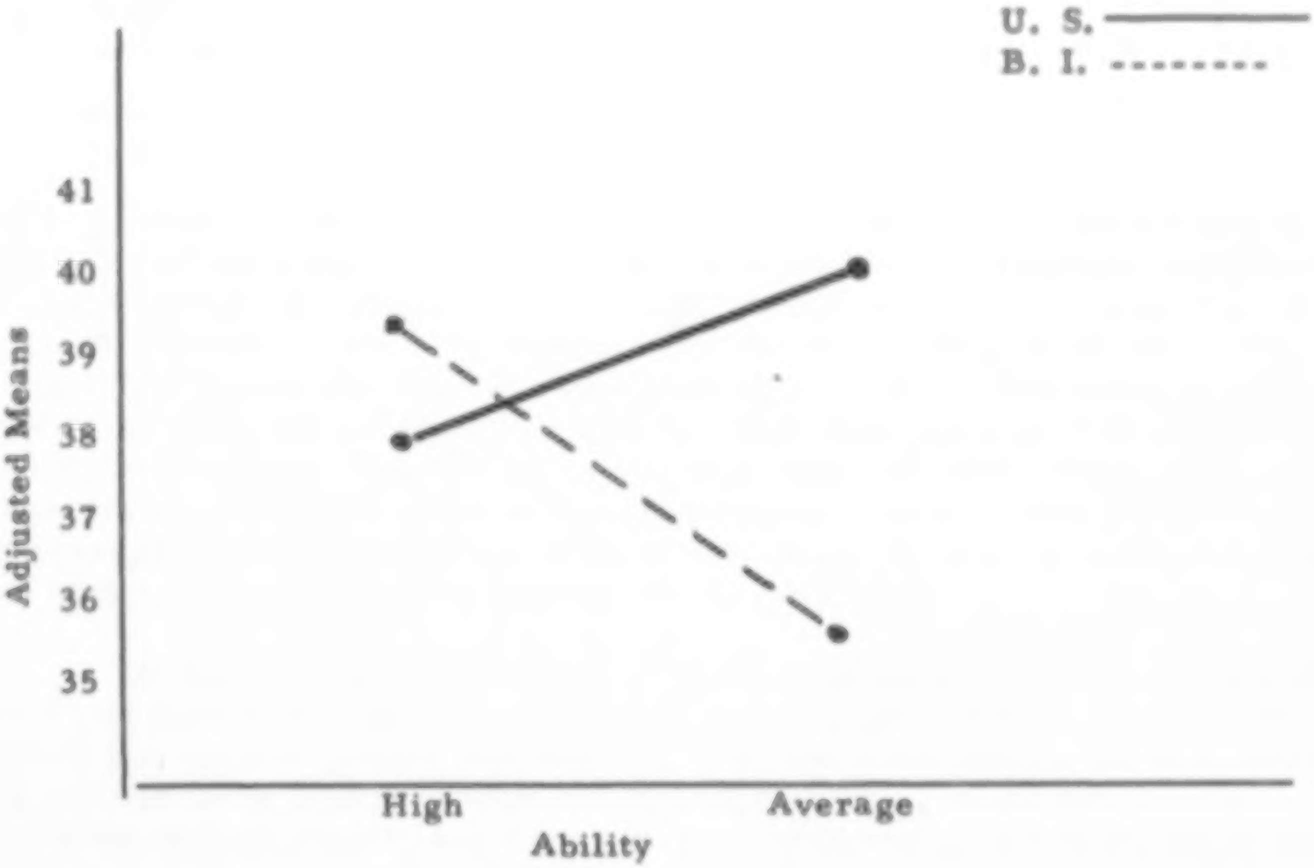


Table 36 presents the mid-year and final-test means for the variables of mechanics of English and spelling for U. S. high and average ability pupils, grades one and two, located in private schools. On the variable of mechanics of English, at mid-year, the U. S. pupils of high and average ability in first grade obtained the higher means. However, British Isles pupils of both high and average ability in second grade obtained the higher mid-year means. The means at the end of year for the U. S. high ability first-grade and average ability second-grade pupils were lower than corresponding British Isles pupils of high ability first grade and average ability second grade. The final test means for U. S. average ability first grade and high ability second grade were higher than obtained means for the British Isles pupils in these categories.

Table 36
Mid-Year And Final-Test Means For English Usage And Spelling,
Grades 1 - 2, Private Schools

		Mechanics of English				Spelling			
		U. S.		Br. Is.		U. S.		Br. Is.	
Grade	Ability	Mid-Yr.	Final	Mid-Yr.	Final	Mid-Yr.	Final	Mid-Yr.	Final
1	High	40.7	46.6	33.0	48.0	6.1	8.4	10.3	11.0
	Average	31.1	37.0	27.1	33.1	3.1	5.1	6.8	8.7
2	High	50.6	55.0	54.2	54.7	13.2	14.2	16.0	17.0
	Average	40.7	46.7	41.6	50.3	9.4	9.8	13.2	15.6

Table 37 presents the F-ratios for the variables of mechanics of English and spelling. On the variable of mechanics of English, significant F-ratios were not obtained for the main effects of grade and country. A significant F-ratio, 7.05, was obtained for the main effect of ability. The adjusted main effect means for ability were: high ability, 48.1, and average ability, 44.6, indicating a significantly higher gain for high than average ability pupils. A significant interaction of grade by ability was also obtained. Figure 46 graphically presents the probable cause of the interaction, namely, that the difference in gain of average ability pupils from first to second grade was considerably greater than for high ability pupils from grades one to two.

On the variable of spelling, a consistent pattern occurred for both mid-year and final test means, namely, the U. S. pupils of both high and average ability and in both grades one and two obtained lower means on this variable than did British Isles pupils of high and average ability grades one and two. Table 37 indicated that no significant F-ratios were obtained on the variable of spelling for main effects or interactions.

Table 37
F-Ratios From the Analysis of Covariance, Mechanics of English And Spelling, Private Schools, Grades 1 - 2

Source of Variation	Degrees of Freedom	Mechanics of English	Spelling
Grade	1	3.77	----
Country	1	1.06	----
Ability	1	7.05**	----
Grade & Country	1	----	3.37
Grade & Ability	1	5.46*	----
Country & Ability	1	----	3.56
Grade & Country & Ability	1	6.56*	----
Within	111		

$^{*}p < .05$
$^{**}p < .01$

Figure 46

Interaction of Means For Mechanics of English by Grade And Ability

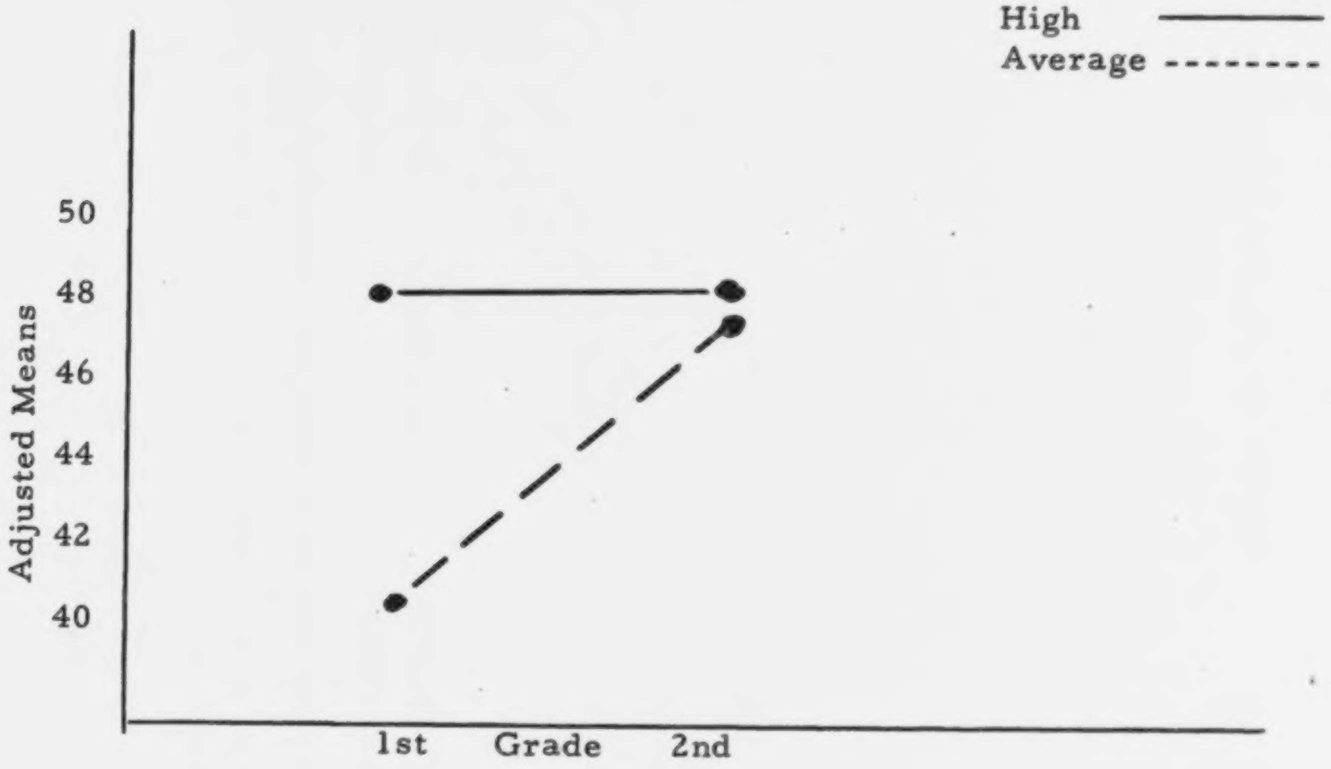


Table 38 presents a summary of significant main effects and interactions for the variables of reading, arithmetic, and English usage for first and second grade pupils located in private schools. Inspection of Table 38 indicated no significant differences in gain obtained on any of the six variables for the main effects of grade or country. Only for the main effect of ability were significant differences in gain obtained; significantly greater gain obtained for higher than average ability pupils on the variables of reading vocabulary and comprehension, and mechanics of English. As will be recalled from the above analysis on the first testing scores wherever significant interactions occur caution need be exercised in the interpretation of significant main effects.

3

Table 38

Summary of Significant Main Effects[1] And Interactions For Variables of Reading, Arithmetic And English Usage, Grades 1 - 2, Private Schools, 2nd-3rd Testing Period

	Reading Vocabulary	Reading Compre.	Arithmetic Reasoning	Arithmetic Fundamentals	Mechanics of English	Spelling
Grade						
Country						
Ability	H*	H			H	
Grade & Country	Sig.		Sig.			
Grade & Ability	Sig.				Sig.	
Country & Ability				Sig.		
Grade & Country & Ability			Sig.		Sig.	

*$p < .05$

[1] All F-Ratios Are Significant at The .01 Level Except Where Asterisk Denotes .05 Level

(2) Private Schools, Grades Three to Six

The following section deals with the results of the performance of pupils of high and average ability in grades three to six who are located in private schools. The results will be presented in the form of means on the respective variables and for pupils of the respective grades for the U. S. and British sample who are of high and average ability. The interpretation of the results will be based upon the analysis of covariance.

Table 39 contains the mid-year and final-test means for Reading vocabulary and comprehension for U. S. and British Isles pupils in grades three, four, five and six of high and average ability. Inspection of Table 39 on the variable of reading vocabulary, indicated that at mid-year the U. S. pupils of high ability third-grade and average ability fifth-grade obtained higher means than British Isles high ability third-grade and average ability fifth-grade pupils. British Isles pupils of average ability, third-grade; high and average ability fourth-grade; high ability fifth-grade; and average ability sixth-grade obtained higher means than corresponding U. S. pupils in these categories. The comparison of means for final test period revealed that the U. S. pupils at all grade levels and ability levels, with the exception of average fifth grade pupils, obtained lower means than corresponding British Isles pupils.

Table 39
Mid-Year And Final Test Means For Reading Vocabulary And Comprehension, Grades 3 - 6, Private Schools

		Vocabulary				Comprehension			
		U. S.		Br. Is.		U. S.		Br. Is.	
Grade	Ability	Mid-Yr.	Final	Mid-Yr.	Final	Mid-Yr.	Final	Mid-Yr.	Final
3	High	34.1	36.5	32.4	41.2	47.7	47.9	40.6	50.0
	Average	29.8	30.6	31.8	35.5	35.0	43.6	29.5	35.9
4	High	42.3	43.8	42.7	44.3	58.3	59.7	54.1	49.8
	Average	32.8	35.6	33.9	36.7	47.4	56.0	39.2	43.4
5	High	44.1	45.5	45.0	46.2	59.9	61.7	59.3	62.2
	Average	39.8	42.3	37.2	39.7	52.4	54.4	42.8	45.6
6	High	41.0	45.3	43.9	50.5	55.7	57.9	53.3	63.5
	Average	31.3	34.4	39.1	40.1	42.7	46.1	37.8	44.8

Table 40 presents the F-ratios for the variables of reading vocabulary and comprehension. On the variable of reading vocabulary, statistically significant F-ratios were obtained for the main effects of grade, country, and ability as well as for the interactions of grade by country and grade by ability. The adjusted main effect means for grade were: third grade, 42.1; fourth grade, 41.7; fifth grade, 42.5; and sixth grade, 44.7. On the main effect of country, the adjusted mean for the U. S. was 41.9 and for the British Isles it was 43.4, indicating a significantly higher gain made by British Isles than U. S. pupils. The adjusted mean for high ability pupils was 43.9 and 40.4 for average ability pupils, indicating that the high ability pupils gained significantly more from mid-year to end-of-year than did average ability pupils. Figures 47 and 48 graphically present the probable explanation for the occurrence of the significant interactions. The grade by country interaction, Figure 47 may have occurred because of the convergence and cross-over of adjusted means at grade four from what it had been at grade three and crossing over at grade five with the U. S. mean higher at this grade level with a subsequent cross-over again at grade six wherein the British Isles adjusted mean was higher than the U. S. adjusted mean. Figure 48 presents the probable cause of the grade by ability interaction. It appeared that the probable cause of this interaction was the closer difference between high and average ability pupils at grades five and four than what they were at grade three and what they became at grade six.

Table 40
F-Ratios From The Analysis of Covariance, Reading Vocabulary And Comprehension
Grades 3 - 6, Private Schools

Source of Variation	Degrees of Freedom	Vocabulary	Comprehension
Grade	3	7.29**	5.41*
Country	1	7.62**	5.14*
Ability	1	33.76**	12.37**
Grade & Country	3	4.69**	4.30*
Grade & Ability	3	5.30**	1.13
Country & Ability	1	1.48	4.93*
Grade & Country & Ability	3	----	1.53
Within	281		

$^{**}p < .01$

Figure 47

Interaction of Means For Reading Vocabulary by Grade And Country

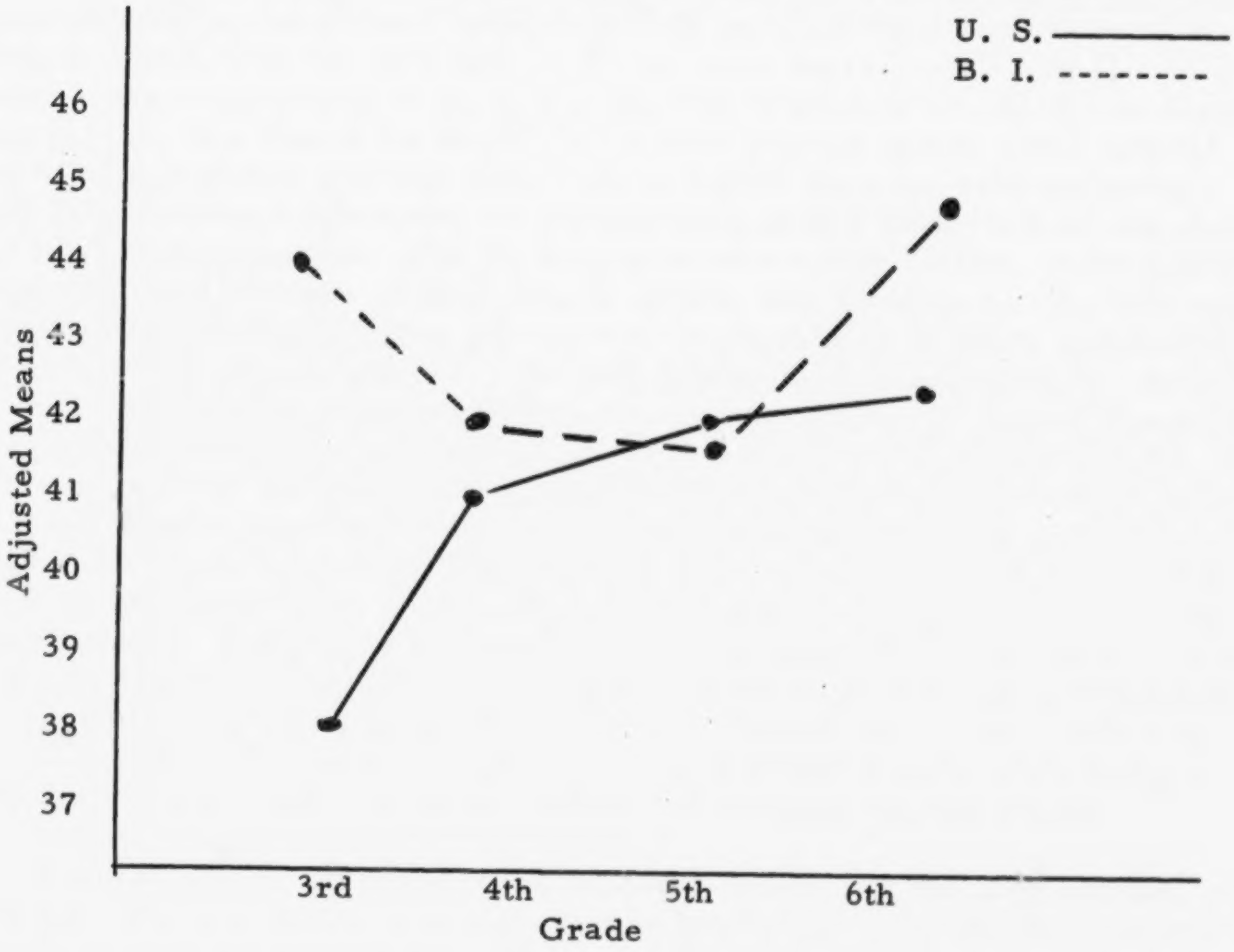


Figure 48

Interaction of Means For Reading Vocabulary by Grade And Ability

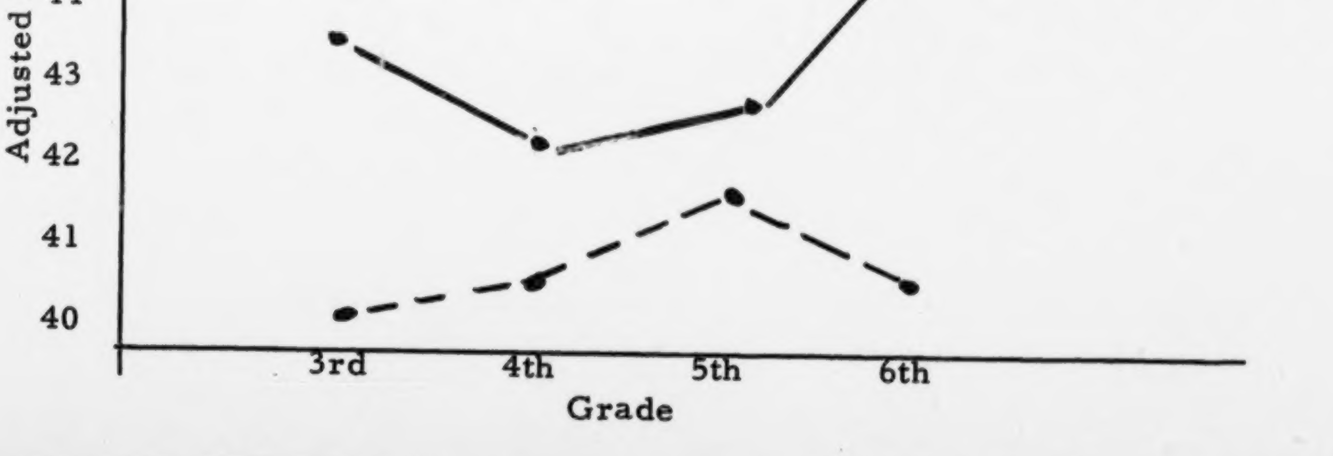


Table 39 also presented the mid-year and final test means for the variable of reading comprehension. Inspection of the Table 39 revealed that a considerably different pattern existed on this variable than was the case for reading vocabulary at the mid-year and, to some degree, at the final-test periods on the comparison of U. S. and British Isles pupils. At the mid-year testing period, the means for the U. S. sample at each grade level and for pupils of both high and average ability were higher than the corresponding British Isles means. However, the consistency of this pattern does not obtain on the final testing period. The U. S. pupils of average ability, third-grade, and both high and average ability, fourth-grade, and average ability fifth-grade, and sixth grade obtained higher means than British Isles at these respective grade and ability levels; however, British Isles pupils of high ability, third, fifth, and sixth-grades obtained higher means than did U. S. pupils at corresponding grade and ability levels. Table 40 presented the F-ratios for the variable of reading comprehension. Significant F-ratios were obtained for all three main effects of grade, country, and ability as well as the grade by country and country by ability interactions. The adjusted means for the main effect of grade were: third grade, 53.6; fourth grade, 53.0; fifth grade, 54.3; and sixth grade, 56.8. The adjusted main effect mean for U. S. was 53.4 and 55.2 for British Isles pupils, indicating significantly greater gain was made by British Isles than U. S. pupils. The adjusted means for the main effect of ability were 55.6 for high ability and 52.0 for average ability, indicating a significantly greater gain made by higher than average ability pupils.

Figures 49 and 50 present the adjusted means for the interactions, respectively, of grade by country and country by ability. The probable cause of the grade by country interaction, Figure 41, was the cross-over of the adjusted means at grade four from what they had been at grade three, and grade six from what was the case at grade five wherein at grades four and five the U. S. adjusted means were higher than British Isles which was not the case at grade three wherein the British Isles mean was higher than U. S., which in turn, was not subsequently the case at grade six wherein the British Isles mean in contrast to grades four and five again was higher than the U. S. The country by ability interaction, Figure 42, undoubtedly occurred because of the relative difference of adjusted means for high ability than average ability U. S. and British Isles pupils wherein the difference for adjusted means for the average U. S. and British Isles pupils was greater than was the case for high ability pupils.

Figure 49

Interaction of Means For Reading Comprehension by Grade And Country

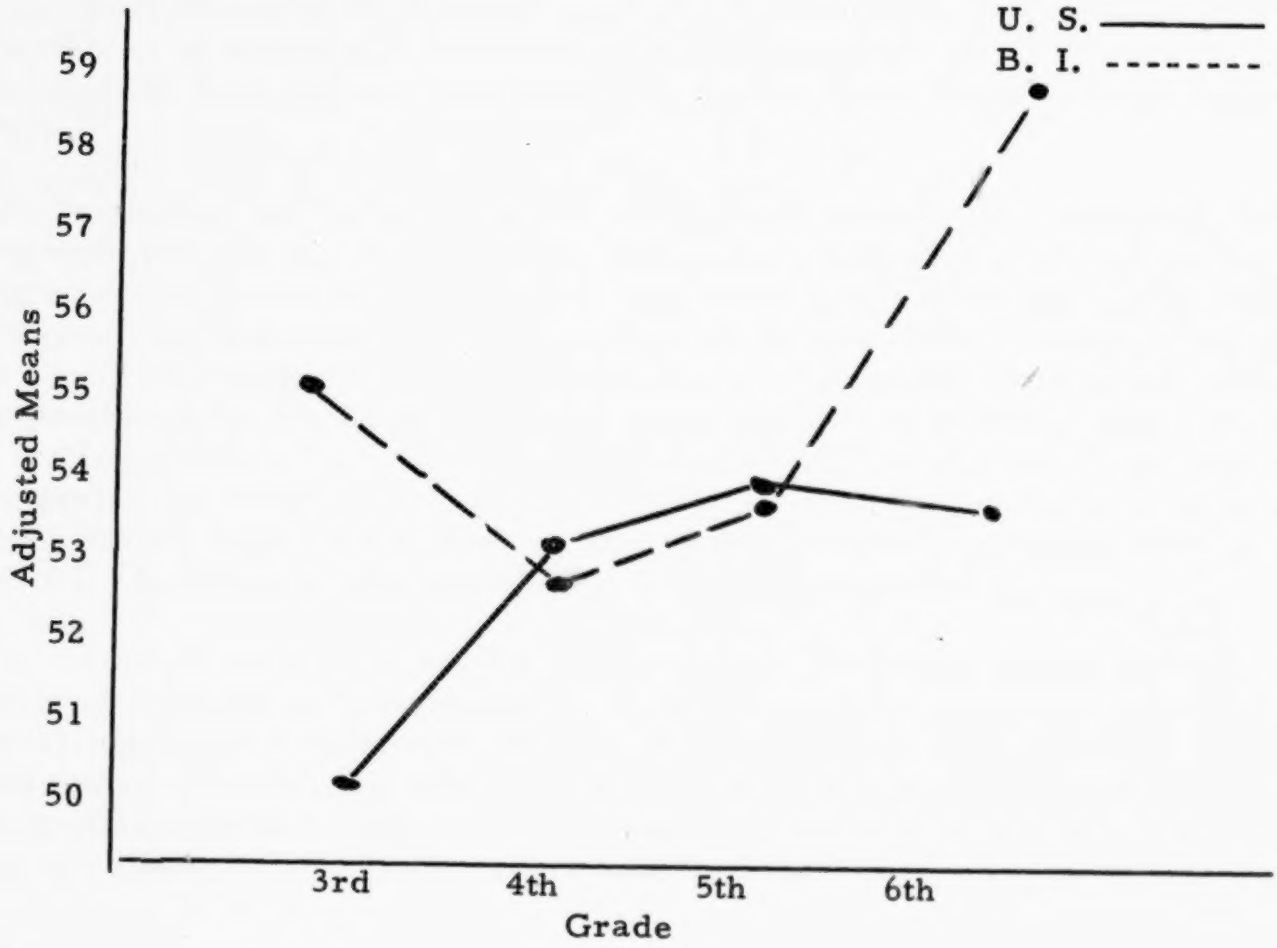


Figure 50

Interaction of Means For Reading Comprehension by Country And Ability

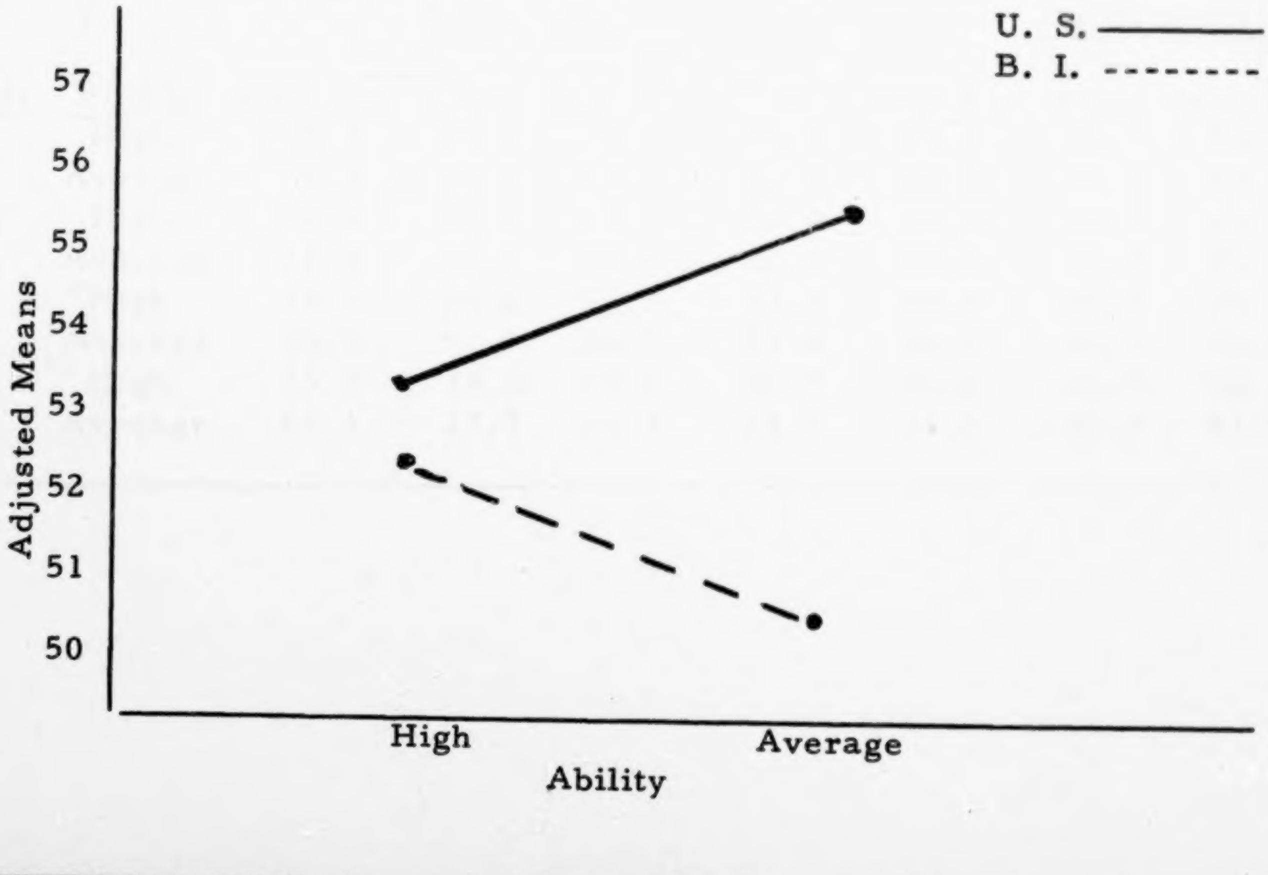


Table 41 presents the mid-year and final-test performance means on the variables of arithmetic reasoning and fundamentals for U. S. and British Isles pupils of high and average ability in grades three to six located in private schools.

Inspection of Table 41, on the variable of arithmetic reasoning, indicates that at mid-year U. S. third, fourth, and sixth grade pupils of high ability and pupils of average ability fourth, fifth, and sixth-grade obtained higher means than British Isles pupils in corresponding grade and ability levels. The British Isles pupils of average ability third-grade and high ability fifth-grade obtained higher means than the U. S. pupils at these ability and grade levels. On the final testing performance, higher means were obtained for the U. S. pupils at every grade and ability level with the exception of average ability third grade and high ability fifth; in all other instances the British Isles mean was lower than the U. S. mean on the variable of arithmetic reasoning.

Table 41 also contains the mid-year and final-test means for the variable of arithmetic fundamentals. Inspection of the means as reported in Table 41 indicated a consistent pattern obtained at both mid-year and final-test periods. The British Isles pupils of both high and average ability in each of the grades obtained higher means than did U. S. high and average ability pupils at corresponding grade levels with one exception, at the final-test period.

Table 41
Mid-Year And Final Test Means For Arithmetic Reasoning And Fundamentals
Grades 3 - 6, Private Schools

		Reasoning				Fundamentals			
		U. S.		Br. Is.		U. S.		Br. Is.	
Grade	Ability	Mid-Yr.	Final	Mid-Yr.	Final	Mid-Yr.	Final	Mid-Yr.	Final
3	High	25.8	25.8	19.7	25.1	23.8	25.9	26.7	31.8
	Average	17.2	20.4	19.0	22.6	12.2	17.6	23.8	28.3
4	High	32.0	34.2	31.7	32.0	36.0	39.9	45.2	48.9
	Average	26.4	30.2	24.4	26.1	29.1	31.7	33.8	38.6
5	High	34.7	36.2	36.3	37.5	44.9	55.1	56.5	59.1
	Average	30.6	31.3	28.3	29.4	36.6	42.2	39.2	42.2
6	High	33.9	38.3	29.3	33.7	51.8	56.7	58.7	64.5
	Average	23.1	27.7	22.3	24.9	34.3	40.6	43.8	46.1

Table 42 presents the F-ratios for the variables of arithmetic reasoning and fundamentals. For the variable of arithmetic reasoning significant F-ratios were obtained for the main effects of grade and ability and on the interaction of grade by country. The adjusted means for the main effect of grade were: third grade, 29.9; fourth, 30.8; fifth, 31.9; and sixth grade, 33.0. On the main effect of ability, the adjusted mean for high ability was 32.2 and 30.1 for average ability, indicating a significantly greater gain favoring high ability pupils. Figure 51 graphically presents the probable cause of the interaction of grade by country main effects. The probable cause of the interaction was the cross-over of adjusted means at every grade level; the U. S. mean was lower at third than British Isles but higher at fourth, again lower at fifth, but then becoming higher again at sixth. This pattern probably caused the interaction of grade by country.

Table 42 contained the F-ratios for the variable of arithmetic fundamentals. The F-ratio for the main effects of grade and ability and the interaction of grade by country were statistically significant beyond the .01 level. The adjusted means for the main effect of grade were: third grade, 43.9; fourth grade, 45.9; fifth, 48.5; and sixth grade, 48.9. The F-ratio for the main effect of country was not statistically significant. The adjusted mean for the main effect of ability for high ability was 48.0 and for average ability, 45.4, indicating significantly greater gain for high ability pupils. Figure 52 presented the adjusted means for the interaction of grade and country. The interaction undoubtedly occurred because of the cross-over of the adjusted means at grade five from what they had been at grades three and four and again what it became at grade six, namely, the U. S. adjusted means being lower than the British Isles means except at grade five.

Table 42
F-Ratios From The Analysis of Covariance, Arithmetic Reasoning And Fundamentals
Grades 3 - 6, Private Schools

Source of Variation	Degrees of Freedom	Reasoning	Fundamentals
Grade	3	8.17**	3.93**
Country	1	2.58	----
Ability	1	13.49**	6.84**
Grade & Country	3	4.58**	3.99**
Grade & Ability	3	2.29	1.16
Country & Ability	1	----	----
Grade & Country & Ability	3	----	1.03
Within	281		

**p $<$ .01

Figure 51

Interaction of Means For Arithmetic Reasoning by Grade And Country

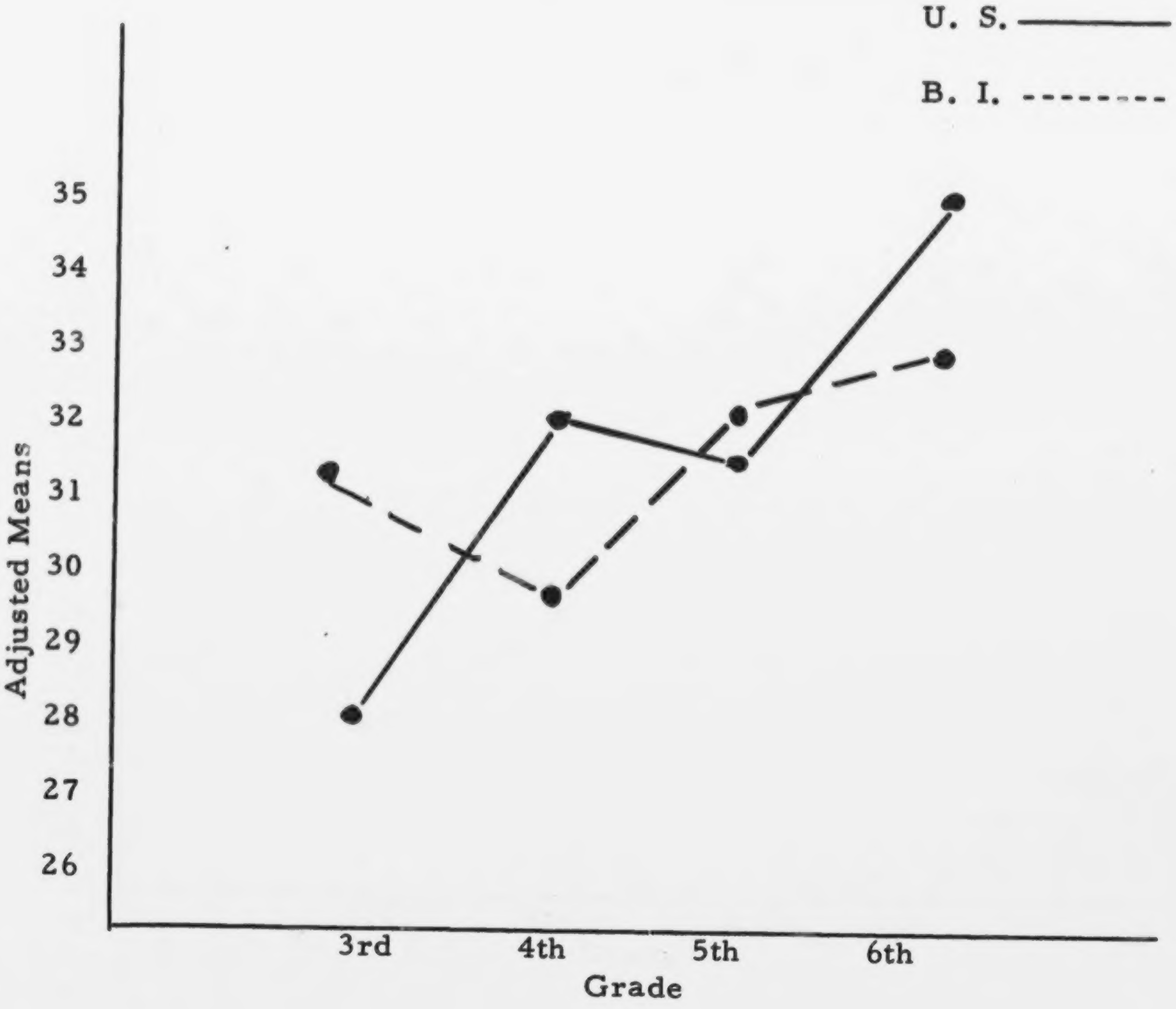


Figure 52

Interaction of Means For Arithmetic Fundamentals by Grade And Country

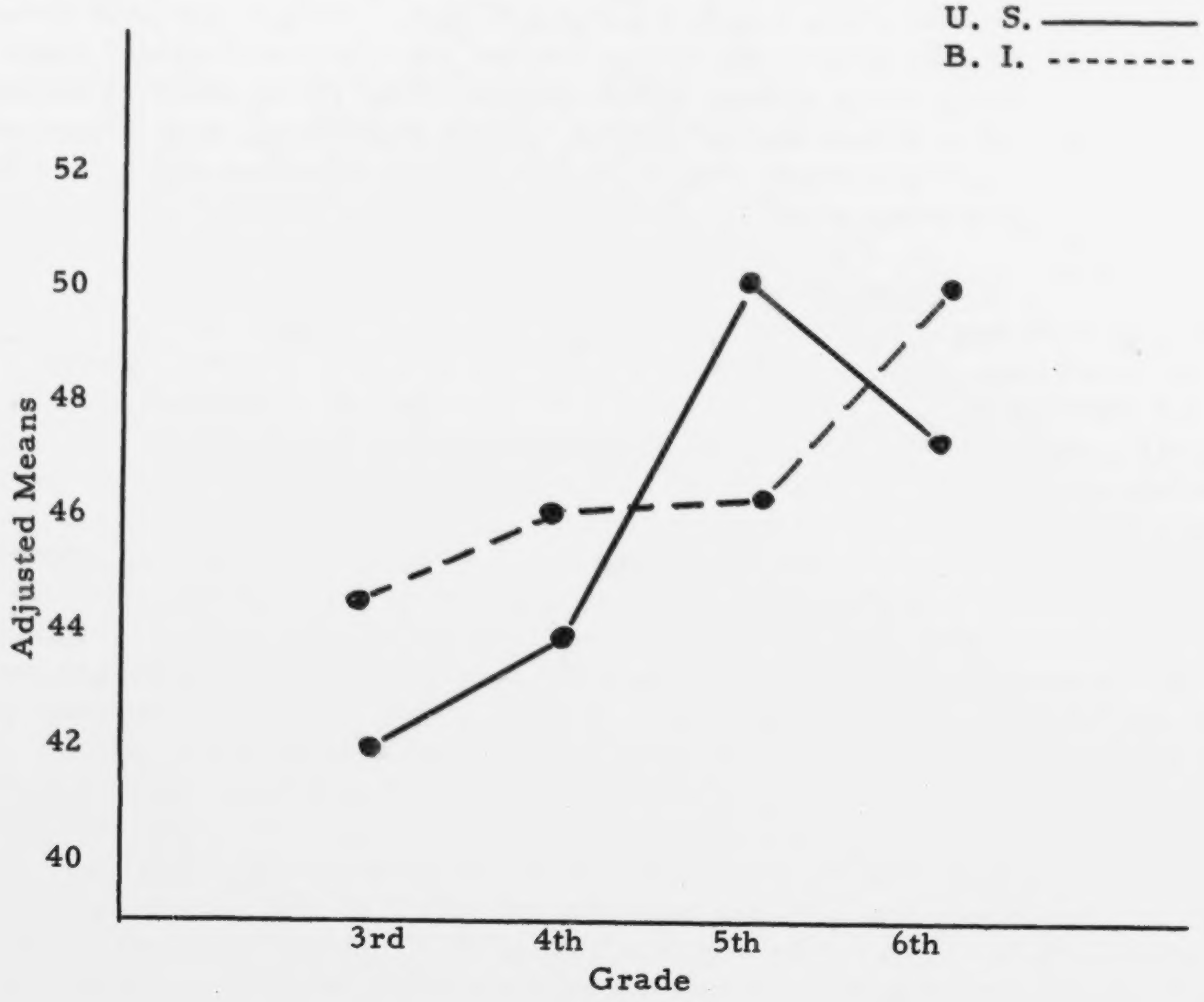


Table 43 presents the mid-year and final-test means for the variables of mechanics of English and spelling for pupils of high and average ability in grades three to six located in private schools. Inspection of Table 43, for the variable mechanics of English, indicated a consistent pattern at both mid-year and final-test periods with the following two exceptions: (1) the U. S. means for average third-grade mid-year, and high ability sixth-grade final-tests, were higher than the British means at these grade and ability levels; and (2) the British Isles average third-grade mid-year mean and high ability sixth-grade final-test means were higher than the U. S. in these respective categories.

Table 44 presents the F-ratios for the variables of mechanics of English and spelling. Neither the grade nor country F-ratios were significant on the variable of mechanics of English. A significant F-ratio was obtained for the main effect of ability as well as an interaction of country by ability. On the main effect of ability, the adjusted means were: high ability, 80.9, and average ability, 78.4, indicating significantly greater gain for high ability pupils. Figure 53 presented the adjusted means for the interaction of country by ability. The probable cause of the interaction was the cross-over of adjusted means wherein the U. S. high-ability adjusted mean was lower than British Isles, but the average-ability U. S. mean was higher than the British Isles average ability mean, indicating that the average U. S. pupils gained more than did the high U. S. pupils, whereas the high British Isles pupils gained more than did the average British Isles pupils on this variable.

Table 43 also contains the mid-year and final-test means for the variable of spelling. Inspection of Table 43 indicated that the mid-year and final-test means for the third-grade U. S. pupils of high and average ability and fourth-grade high ability pupils on both mid-year and final, and fourth-grade average ability pupils on the final-test period were lower than corresponding British Isles pupils at the same grade and ability levels. The means for both high and average ability fifth-grade U. S. pupils were higher than British Isles high and average ability fifth-grade pupils. At the sixth-grade the pattern is reversed; namely, the British Isles high and average ability pupils obtained higher means than did high and average ability sixth-grade U. S. pupils. It should be noted that the lower means at sixth grade than at fifth grade for both high and average ability pupils occurred because the sixth-grade pupils had taken a higher grade level battery; namely, the seven, eight, and nine-battery. Therefore, a lower "rights" score was obtained at the sixth grade on all of the variables in comparison with final fifth grade scores.

Table 44 contains the significant F-ratios for the variable of spelling. Significant F-ratios were obtained for the main effects of grade and country and for the grade by ability interaction. The adjusted means for the main effect of grade were: third grade, 21.5; fourth, 21.1; fifth, 22.4; and sixth, 20.8. The adjusted means for the main effect of country were 20.8 for the U. S. and 21.8 for British Isles, indicating a significantly greater gain for British Isles than for U. S.

Figure 54 presented the adjusted means for the interaction of grade by ability. Undoubtedly the interaction occurred because of the change-over of means at grade five wherein the adjusted mean for high ability was lower at third and fourth grade but higher at fifth and sixth grade than average ability means.

Table 43
Mid-Year And Final Test Means For Mechanics of English And Spelling, Grades 3 - 6, Private Schools

		Mechanics of English				Spelling			
		U. S.		Br. Is.		U. S.		Br. Is.	
Grade	Ability	Mid-Yr.	Final	Mid-Yr.	Final	Mid-Yr.	Final	Mid-Yr.	Final
3	High	59.6	69.3	54.4	66.4	16.7	17.2	17.4	20.3
	Average	49.0	64.4	51.3	63.5	9.2	15.6	11.8	16.1
4	High	88.0	90.7	82.6	77.0	22.6	21.4	23.2	23.1
	Average	73.1	85.8	58.3	66.6	17.3	18.1	16.3	19.1
5	High	93.5	93.3	84.9	88.7	23.9	24.7	23.4	24.5
	Average	83.8	87.0	63.7	68.5	20.9	22.6	18.2	19.8
6	High	77.6	81.2	75.1	84.0	20.8	20.6	23.3	23.9
	Average	69.0	75.1	68.4	69.1	17.0	15.3	20.1	19.9

Table 44

F-Ratios From The Analysis of Covariance, Mechanics of English And Spelling, Grades 3 - 6, Private Schools

Source of Variation	Degrees of Freedom	Mechanics of English	Spelling
Grade	3	----	4.76**
Country	1	----	8.58**
Ability	1	6.05*	3.47
Grade & Country	3	----	2.52
Grade & Ability	3	2.07	3.30*
Country & Ability	1	5.52*	----
Grade & Country & Ability	3	1.88	1.44
Within	281		

$^{*}p < .05$
$^{**}p < .01$

Figure 53

Interaction of Means For Mechanics of English by Country And Ability

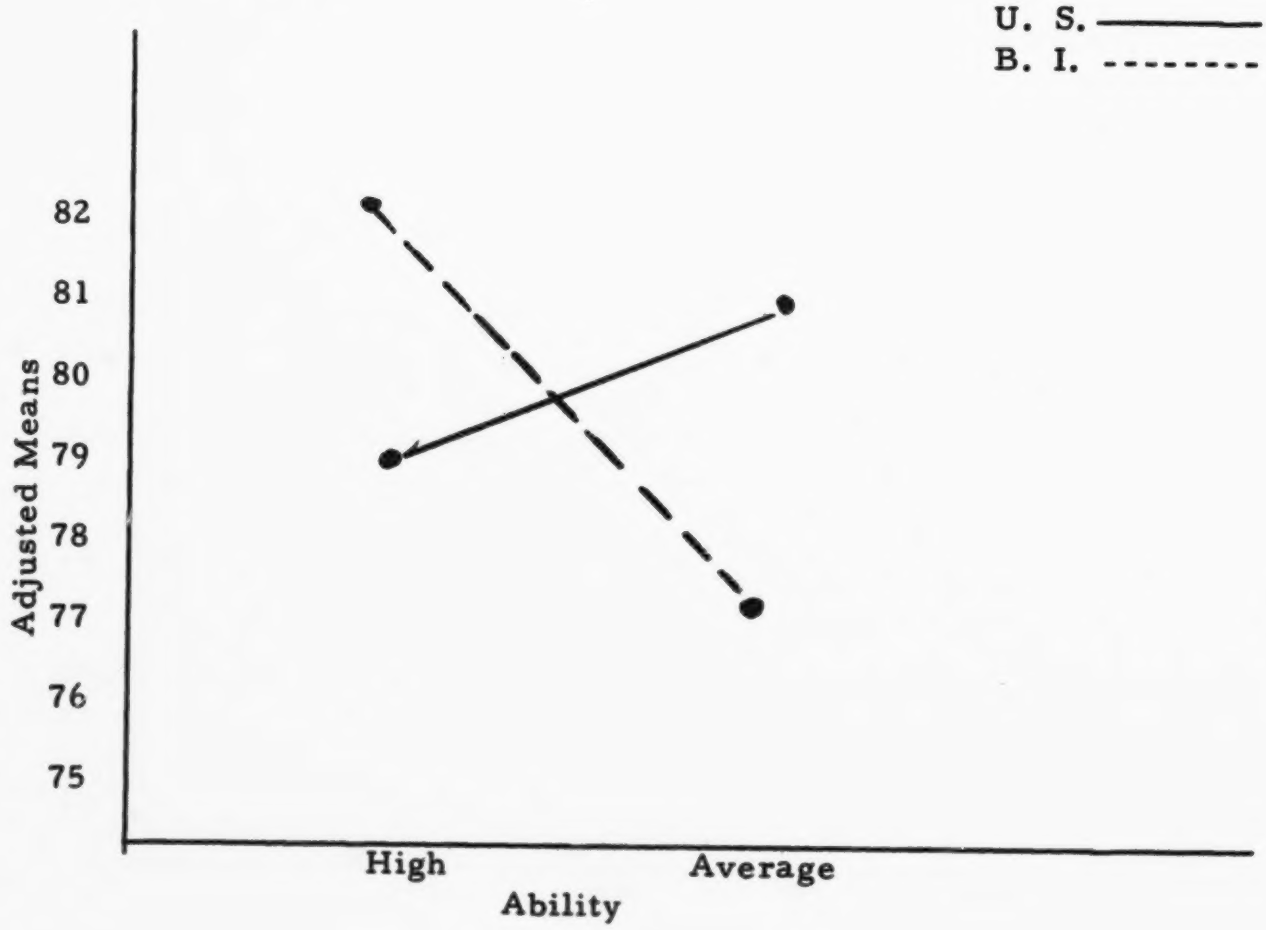


Figure 54

Interaction of Means For Spelling by Grade And Ability

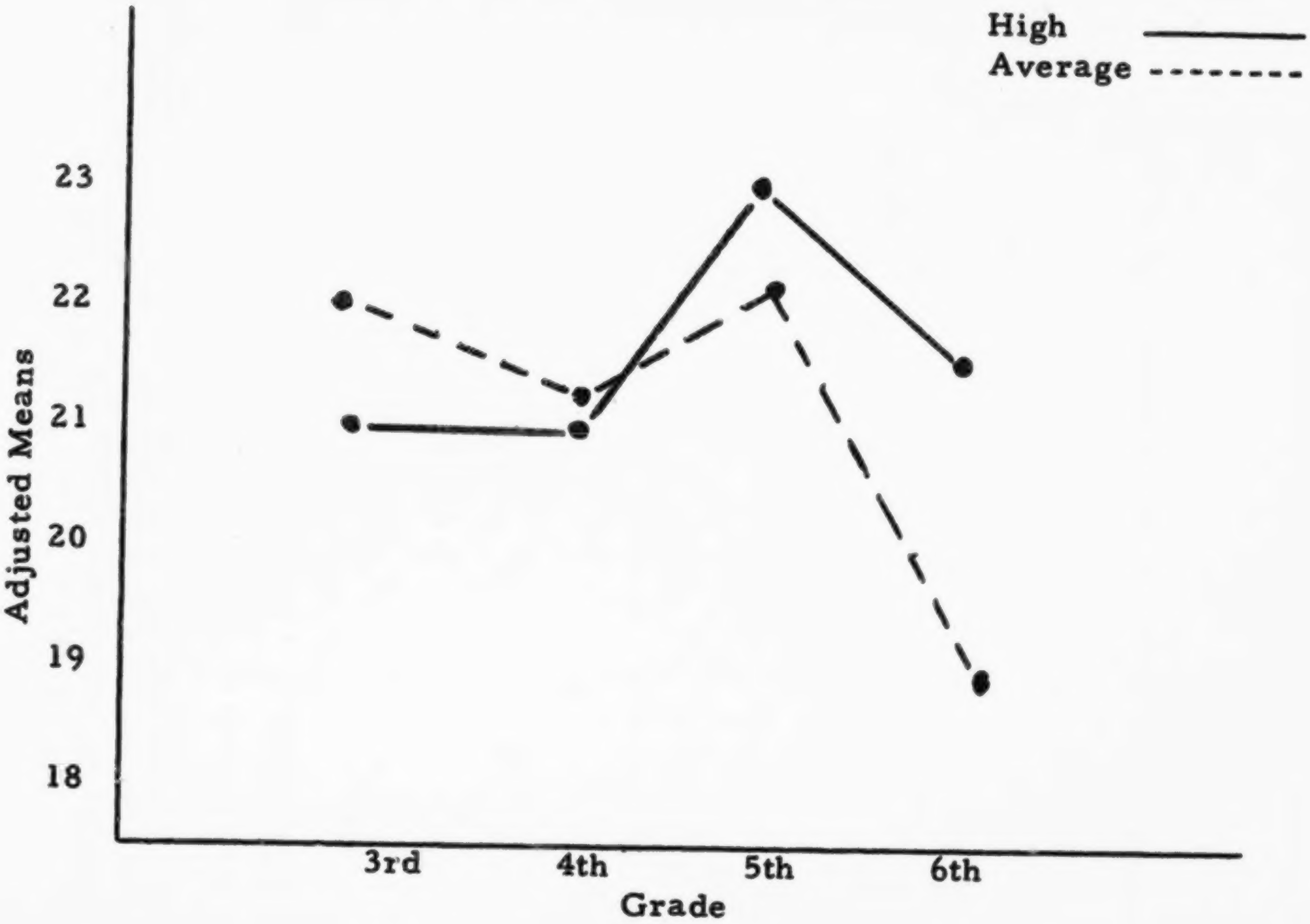


Table 45 presented a summary of the significant main effects and interactions of grade, country and ability on the variables of reading, arithmetic, and English usage. Inspection of Table 43 indicated that a significant grade main effect was obtained on five of the six variables indicating a consistent difference between performance of pupils from grade to grade. On the three variables of reading vocabulary, reading comprehension and spelling a significant F-ratio was found for the differences between performance of U. S. and British Isles pupils for this main effect of country. In each instance the British Isles pupils gained significantly more than did U. S. pupils. On five of the six variables, excluding spelling, the high ability pupils gained significantly more than average ability pupils. The significant interactions that were observed in Table 45 indicated the necessity for caution in interpreting the main effects of grade, country and ability.

Table 45

Summary of Significant Main Effects[1] And Interactions For Variables of Reading, Arithmetic And English Usage, Grades 3 - 6, Private Schools, 2nd - 3rd Testing Period

	Reading Vocabulary	Reading Compre.	Arithmetic Reasoning	Arithmetic Fundamentals	Mechanics of English	Spelling
Grade	Sig.	Sig.*	Sig.	Sig.		Sig.
Country	B. I.	B. I.*				B. I.
Ability	H	H	H	H	H*	
Grade & Country	Sig.	Sig.*	Sig.	Sig.		
Grade & Ability	Sig.					Sig.*
Country & Ability		Sig.*			Sig.*	
Grade & Country & Ability						

*$p < .05$

[1] All F-Ratios are significant at the .01 level except where asterisk denotes .05 level

(3) Public Schools, Grades 1 and 2

This section dealt with the results of the mid-year and final-test performances on the variables of reading--vocabulary and comprehension; arithmetic-reasoning and fundamentals; and English usage-mechanics of English and spelling for U. S. and British Isles pupils, grades 1 - 2, located in public schools. The first part of this section will deal with the results for mean performance on the variables for pupils in grades one and two. The second and final section will deal with the analysis of the results for pupils in grades three to six located in public schools.

Table 46 presented the means for the mid-year and final-test periods on the variables of reading vocabulary and comprehension. Inspection of Table 46, on the variable of reading vocabulary, indicated that a consistent pattern occurred. The U. S. first-grade pupils of high and average ability on both mid-year and final-test periods and U. S. second-grade pupils of high and low ability obtained lower means than did the corresponding British Isles pupils at both mid-year and final-test periods; however, U. S. first-grade pupils of low ability obtained higher means than British Isles first-grade pupils of low ability on both the mid-year and final-test periods. Second-grade U. S. pupils of average ability obtained lower mid-year means, whereas on the final testing periods, the means for average U. S. and British Isles second-graders were only fractionally different. On the variable of reading comprehension, Table 46, indicated that a similar pattern existed as obtained for reading vocabulary at mid-year testing: the U. S. first-grade pupils of high and average ability and second-grade average and low ability obtained lower means than British Isles pupils of same ability and grade levels. In only two instances did the U. S. pupils obtain higher means; first-grade pupils of low ability and second-grade pupils of high ability obtained the higher means than British Isles. A different pattern occurred on the variable of reading comprehension on the final-test performance. First-grade U. S. pupils of high ability obtained a lower mean on the final test performance; however, in all other instances the U. S. mean was higher than the British Isles.

Table 46
Mid-Year And Final-Test Means For Reading Vocabulary And Comprehension
Grades 1 - 2, Public Schools

		Vocabulary				Comprehension			
		U. S.		Br. Is.		U. S.		Br. Is.	
Grade	Ability	Mid-Yr.	Final	Mid-Yr.	Final	Mid-Yr.	Final	Mid-Yr.	Final
	High	46.9	60.7	65.4	69.6	4.5	8.7	9.8	12.0
1	Average	40.1	53.8	52.7	59.2	3.7	7.5	4.8	6.8
	Low	42.2	54.5	34.8	42.5	3.9	7.6	2.4	3.2
	High	68.0	71.1	70.0	72.6	12.5	13.8	12.2	13.4
2	Average	62.1	67.7	67.0	67.3	9.8	11.8	10.2	11.1
	Low	60.8	65.4	64.1	66.4	9.5	11.8	9.8	10.7

Table 47 presented the F-ratios for the variables of reading vocabulary and comprehension. Statistically significant F-ratios were obtained on the main effects of country and ability on the variable of reading vocabulary. No other F-ratios were statistically significant. The adjusted mean for the main effect of country for U. S. was 63.0 and was 60.4 for British Isles, indicating a significant difference in gain favoring U. S. The adjusted means for the main effect of ability were: high ability, 63.8; average ability, 62.0; and low ability, 60.6. Table 45 also contained the F-ratios for the variable of reading comprehension. Significant F-ratios were obtained on the three main effects of grade, country, and ability. The adjusted means for the main effect of grade were: first grade, 9.6 and second grade, 10.4, indicating a significantly greater gain for second-than first-grade. The adjusted mean for the main effect of country, was U. S., 10.2 and British Isles, 9.2, indicating a significant difference in gain favoring U. S. The adjusted means for the main effect of ability were: high ability, 10.6; average, 9.6; and low ability, 9.4.

Figure 55 graphically illustrated the possible cause of the interaction of country and ability. The interaction probably occurred because of the divergence of the adjusted means at the average and low ability levels from what was the observed adjusted means for U. S. and British Isles pupils of high ability.

Table 47

F-Ratios From The Analysis of Covariance, Reading Vocabulary And Comprehension, Grades 1 - 2, Public Schools

Source of Variation	Degrees of Freedom	Vocabulary	Comprehension
Grade	1	---	5.40*
Country	1	12.72**	8.95**
Ability	2	7.87**	6.89**
Grade & Country	1	1.70	---
Grade & Ability	2	2.22	1.17
Country & Ability	2	1.62	4.43*
Grade & Country & Ability	2	2.01	1.17
Within	496		

**p < .01

Figure 55

Interaction of Means For Reading Comprehension by Country And Ability

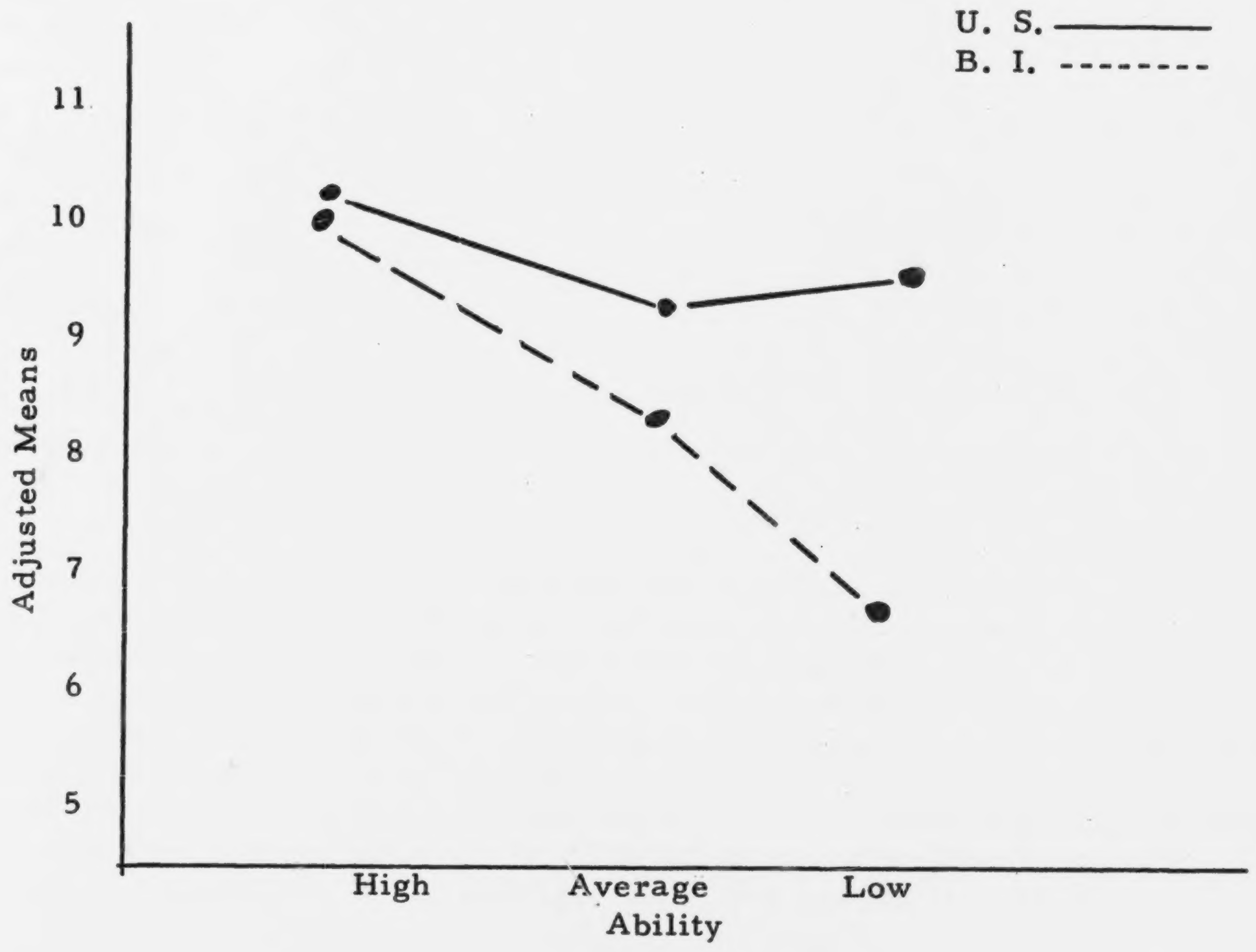


Table 48 presented the mid-year and final-test means for the variables of arithmetic reasoning and fundamentals for U. S. and British Isles pupils in grades one and two located in public schools. A consistent pattern occurred for pupils of high and average ability in first grade, namely, on both of these variables and at both mid-year and final-test periods, the U. S. first-grade pupils of high and average ability obtained lower means than British Isles first-grade pupils of high and average ability. A reversal in pattern occurred on the variables of arithmetic reasoning and fundamentals. U. S. first-grade pupils of low ability at both mid-year and final-test periods and second-grade pupils of high, average, and low ability obtained higher means on this variable. However, on the variable of arithmetic fundamentals, with only two exceptions, the mid-year and final-test means for U. S. pupils were lower than for British Isles pupils in these respective ability and grade levels. Only for low ability first and second-graders on the final-test performance did this pattern not remain in favor of British Isles pupils: (1) U. S. first-grade pupils of low ability obtained a higher mean than British Isles first-grade pupils of low ability and (2) British Isles and U. S. second-grade pupils of low ability obtained the same means on final-test performance.

Table 48
Mid-Year And Final-Test Means For Arithmetic Reasoning And Fundamentals
Grades 1 - 2, Public Schools

		Reasoning				Fundamentals			
		U. S.		Br. Is.		U. S.		Br. Is.	
Grade	Ability	Mid-Yr.	Final	Mid-Yr.	Final	Mid-Yr.	Final	Mid-Yr.	Final
	High	25.3	32.3	34.4	36.5	24.0	35.8	39.2	41.4
1	Average	23.1	29.4	26.4	31.2	20.0	29.4	31.8	36.1
	Low	22.4	29.0	15.4	21.2	17.3	30.2	23.8	22.1
	High	38.3	40.4	36.8	39.0	39.7	42.2	43.4	43.7
2	Average	35.1	37.4	33.7	36.3	37.9	40.1	41.3	42.9
	Low	32.0	37.3	31.1	32.4	36.3	39.9	40.9	39.9

Table 49 presents the F-ratios for the variables of arithmetic reasoning and fundamentals. On the variable of arithmetic reasoning, statistically significant F-ratios were obtained for the main effects of grade, country, and ability, and on the interaction of country by ability. The adjusted mean for the main effect of grade was, first grade 33.6, and second grade, 34.7, indicating a significantly greater gain favoring second-grade pupils. The adjusted means for the main effect of country indicated that the U. S. (34.4) obtained a significantly greater gain than British Isles (33.1). The adjusted main effect means for ability were: high ability, 35.0; average, 33.5; and low ability, 33.3.

Figure 56 graphically presented the probable cause of the interaction of country by ability. The greater difference in adjusted means between U. S. and British Isles low-ability pupils became greater than had been the difference for high and average ability U. S. and British Isles pupils, in each case favoring the gain made by U. S.

Table 49 also contained the F-ratios for the variable of arithmetic fundamentals. Statistically significant F-ratios were obtained on the main effects of country and ability and on the interactions of grade by ability and grade by country. The adjusted mean for the main effect of country for the U. S. (36.9) was higher than British Isles (35.5), indicating a significant difference in gain favoring U. S. The adjusted means for the main effect of ability were: high ability, 38.2; average 35.6; and low ability, 35.2.

Figures 57 and 58 graphically presented the probable causes of the interactions of grade by ability and country by ability, respectively, on the variable of arithmetic fundamentals. The grade by ability interaction, Figure 57, probably occurred because of the cross-over of the adjusted means at average ability and continuing in a similar direction for low ability than had been the case for high ability first-and second-grade pupils. The interaction of country by ability, on the variable of arithmetic fundamentals, Figure 58, probably occurred because of the cross-over of average-ability adjusted means wherein U. S. high ability adjusted mean was higher than British Isles but lower for average ability and again crossing over for low ability wherein the adjusted mean was higher for U. S. as had been the case for high ability.

Figure 56

Interaction of Means For Arithmetic Reasoning by Country And Ability

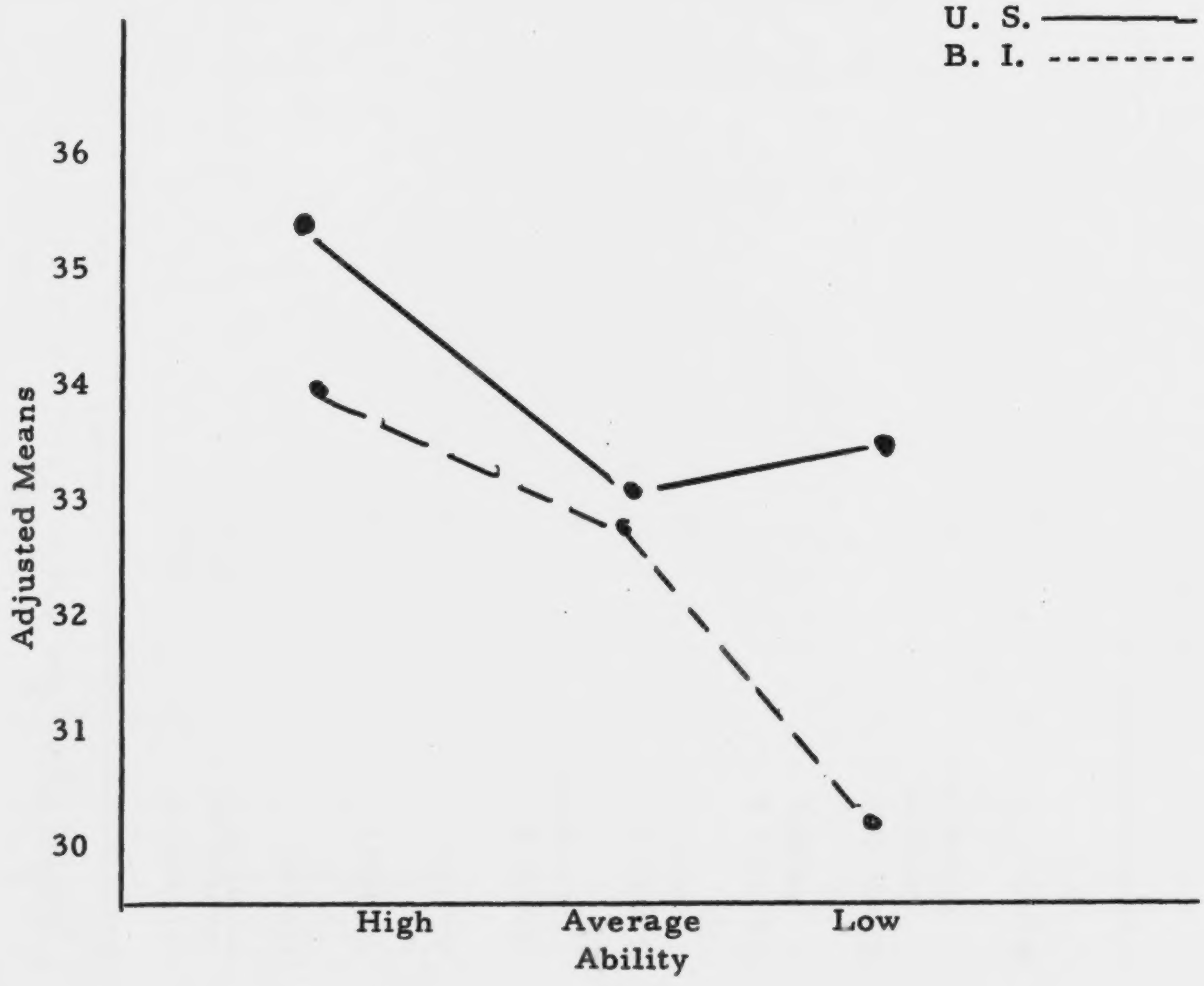


Table 49
F-Ratios From The Analysis of Covariance, Arithmetic Reasoning And Fundamentals
Grades 1 - 2, Public Schools

Source of Variation	Degrees of Freedom	Reasoning	Fundamentals
Grade	1	5.48*	1.42
Country	1	7.53**	4.23*
Ability	2	7.62**	11.21**
Grade & Country	1	---	3.25
Grade & Ability	2	2.10	3.98*
Country & Ability	2	4.47*	11.01**
Grade & Country & Ability	2	---	2.89
Within	496		

*p <.05
**p <.01

Figure 57
Interaction of Means For Arithmetic Fundamentals by Grade And Ability

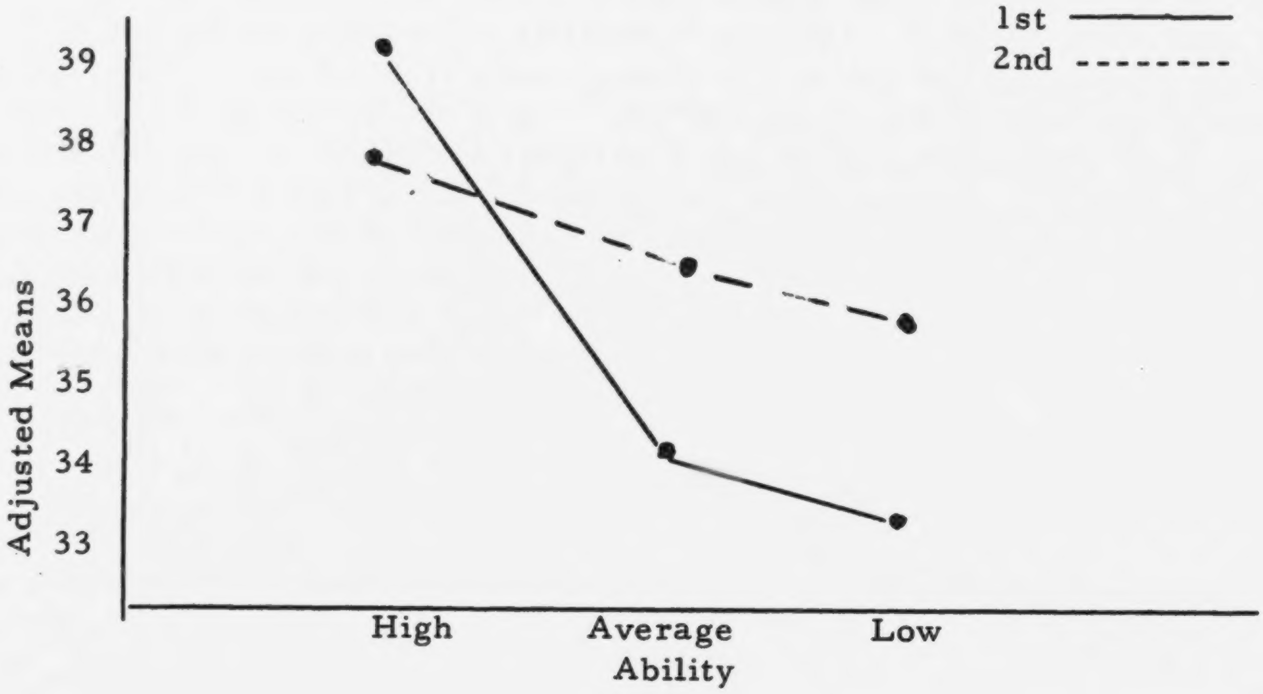


Figure 58
Interaction of Means For Arithmetic Fundamentals by Country And Ability

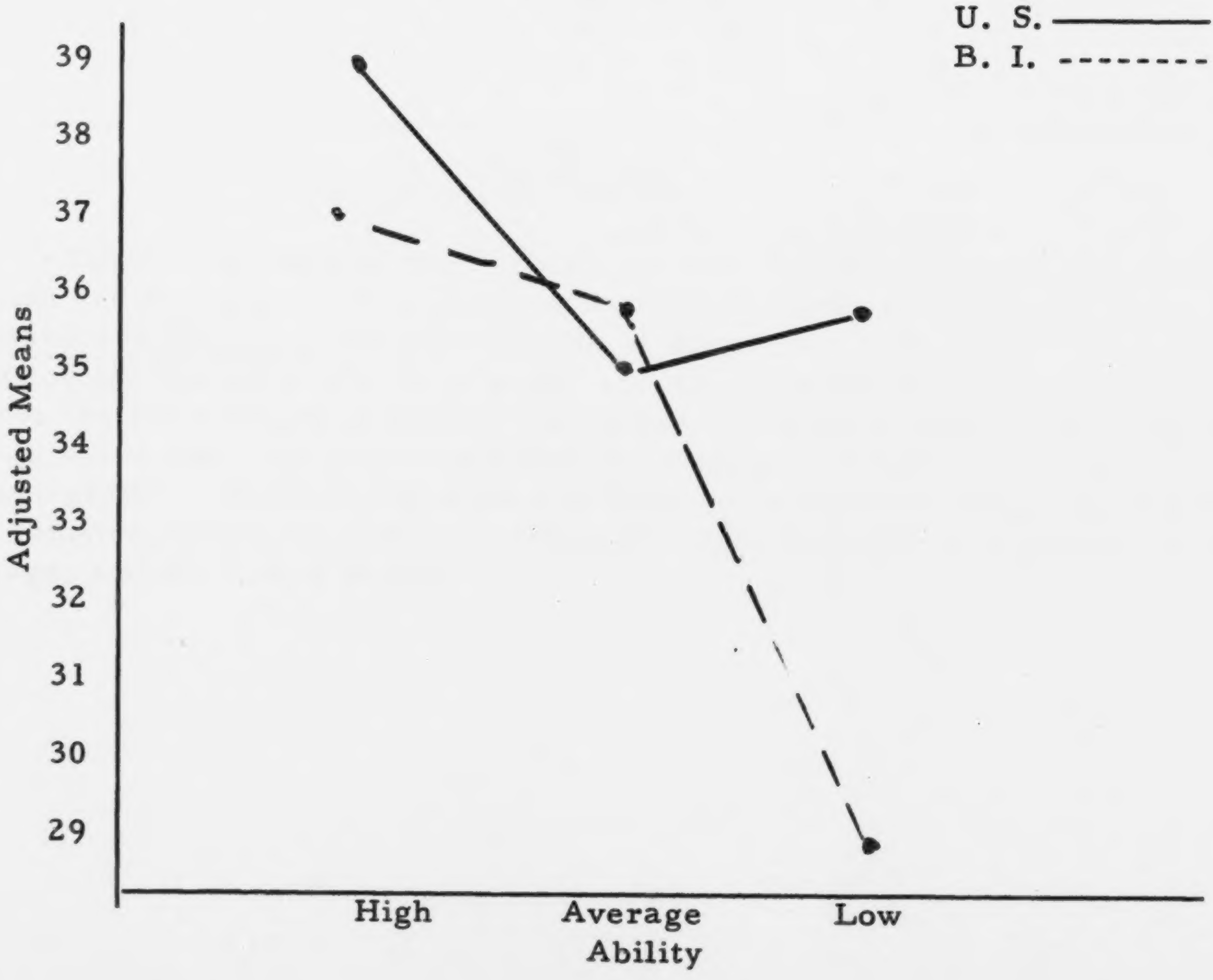


Table 50 presents the mid-year and final-test period means for the variables of mechanics of English and spelling for pupils in grades one and two located in public schools for the U. S. and British Isles sample. Inspection of Table 50 indicates the following consistent patterns: (1) at both mid-year and final-test periods U. S. first-grade pupils of high and average ability on both mechanics of English and spelling obtained lower means than corresponding British Isles pupils; (2) on the variable of mechanics of English, U. S. first-grade pupils of low ability and second-grade pupils of high, average, and low ability obtained the higher means at both mid-year and final-test periods; (3) in all instances, on the variable of spelling, the U. S. pupils at both mid-year and final-test periods at all ability levels and both grade levels obtained lower means than British Isles pupils.

Table 50
Mid-Year And Final-Test Means For Mechanics of English And Spelling, Grades 1 - 2, Public Schools

		Mechanics of English				Spelling			
		U. S.		Br. Is.		U. S.		Br. Is.	
Grade	Ability	Mid-Yr.	Final	Mid-Yr.	Final	Mid-Yr.	Final	Mid-Yr.	Final
	High	35.6	43.9	47.8	52.1	3.1	7.2	13.3	15.4
1	Average	30.6	38.1	35.2	40.8	2.4	4.8	9.4	10.8
	Low	29.7	34.7	25.2	32.9	2.3	5.4	4.9	6.2
	High	51.8	56.1	51.0	54.4	12.3	16.0	17.2	16.2
2	Average	45.4	50.6	44.3	48.3	10.2	13.0	14.8	15.1
	Low	42.6	46.8	32.2	38.2	11.4	13.4	16.1	14.4

Table 51 presented the F-ratios for the variables of mechanics of English and spelling for first-and second-grade pupils in public schools.

Mechanics of English. On the variable of mechanics of English, Table 51, the F-ratios for the main effects of grade and ability were statistically significant; neither the main effect of country nor interactions were statistically significant. The adjusted mean for the main effect for first-grade was 44.5, and 46.6 for second-grade, indicating significant difference in gain favoring second grade. The adjusted means for the main effect of ability were 47.0, high ability; 45.0, average; and 42.7, low ability.

On the variable of spelling, Table 51, statistically significant F-ratios were obtained on the main effects of grade and ability and on the interaction of grade by country. The adjusted means for the main effect of grade were: 9.4, first grade; and 11.7, second grade, indicating a significant difference in gain favoring second grade. The adjusted means for the main effect of ability were: 11.4, high ability; 9.8, average ability; and 9.6, low ability.

Figure 59 graphically presented the probable cause of the interaction of grade and country. The cross-over of adjusted means undoubtedly caused this interaction in which the adjusted means undoubtedly caused this interaction in which the adjusted first grade mean for U. S. was lower at first grade but became higher at second grade than the British Isles adjusted mean.

Figure 59

Interaction of Means For Spelling by Grade And Country

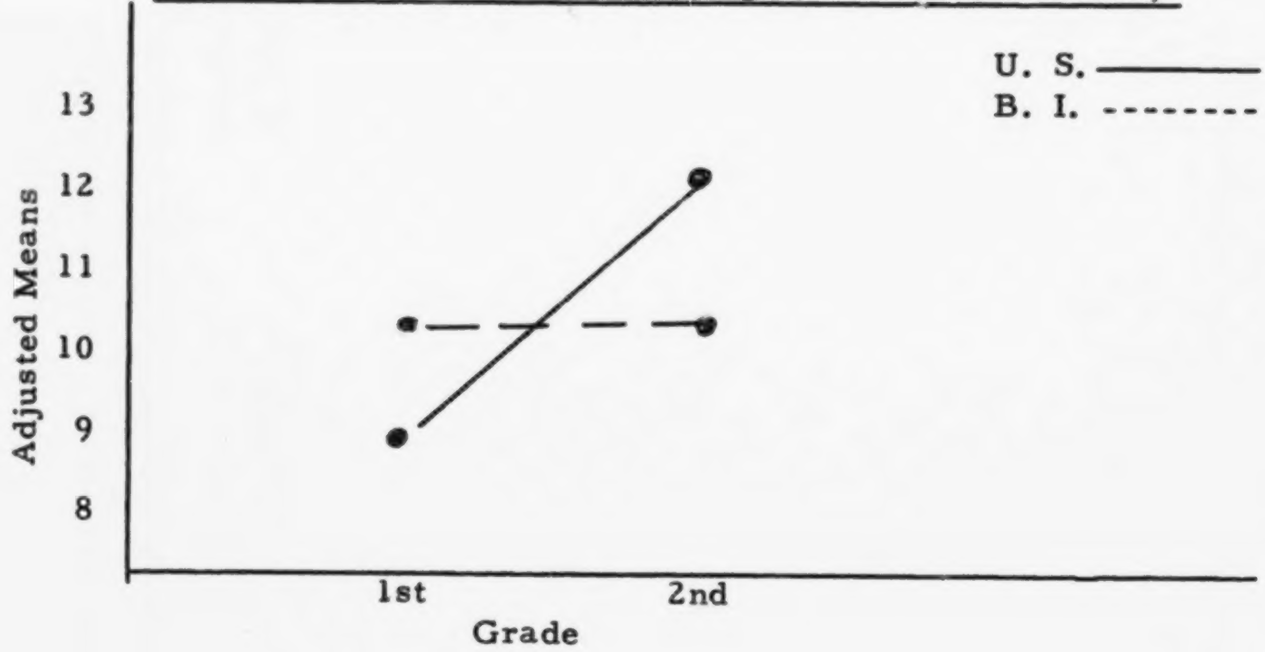


Table 51

F-Ratios From the Analysis of Covariance, Mechanics of English And Spelling Grades 1 - 2, Public Schools

Source of Variation	Degrees of Freedom	Mechanics of English	Spelling
Grade	1	7.42**	35.04**
Country	1	---	----
Ability	2	10.18**	15.99**
Grade & Country	1	---	19.00**
Grade & Ability	2	---	----
Country & Ability	2	---	2.13
Grade & Country & Ability	2	---	1.73
Within	496		

**p $<$ .01

Table 52 presents a summary of the significant main effects and interactions that were obtained on the variables of reading, arithmetic, and English usage for first-and second-grade pupils located in public schools on adjusted test performance. It should be recalled that for purposes of this study significant F-ratios that were obtained from the analysis of covariance essentially indicated a difference in gain from the mid-year to the final-testing period. Inspection of Table 52 indicated that second-grade pupils gained significantly more than first grade pupils on the variables of reading comprehension, arithmetic reasoning, mechanics of English, and spelling. The U. S. pupils gained significantly more than British Isles pupils on the variables of reading vocabulary, reading comprehension, arithmetic reasoning and arithmetic fundamentals. The main effect of ability was significant on each of the six variables. The presence of significant interactions indicated that caution must be exercised in the interpretation of the main effects wherein significant interaction of those main effects were present.

Table 52

Summary of Significant Main Effects[1] And Interactions For Variables of Reading, Arithmetic and English Usage, Grades 1 - 2, Public Schools, 2nd - 3rd Testing Period

	Reading Vocabulary	Reading Compre.	Arithmetic Reasoning	Arithmetic Fundamentals	Mechanics of English	Spelling
Grade		2nd*	2nd*		2nd	2nd
Country	U. S.	U. S.	U. S.	U. S.*		
Ability	Sig.	Sig.	Sig.	Sig.	Sig.	Sig.
Grade & Country						Sig.
Grade & Ability				Sig.*		
Country & Ability		Sig.*	Sig.*	Sig.		
Grade & Country & Ability						

*p $<$ .05

[1] All F-Ratios are significant at the .01 level except where asterisk denotes .05 level.

(4) Public School, Grades Three to Six

This section presented the results of U. S. and British Isles pupils grades three to six, public schools, on the variables of reading, arithmetic, and English usage. The mid-year and final-test performance means are presented in Tables 53, 55, and 57. Tables 54, 56, and 58 contain the significant F-ratios obtained from the analysis of covariance for adjusted scores from mid-year to final-test performance.

The means for mid-year and final-test performance on the variables of reading vocabulary and comprehension for pupils of high and average ability in grades three to six appeared in Table 53. On the variable of reading vocabulary, with the one lone exception of sixth-grade pupils of high ability on the mid-year testing wherein the means were essentially the same, the means for both mid-year and final-test performance for U. S. pupils of high and average ability in grades three to six were lower than corresponding British Isles pupils mean performance.

On the variable of reading comprehension, the final-test means for U. S. third-grade pupils of high ability was higher than corresponding British Isles high ability third-grade pupils. However, at mid-year for third-grade pupils of high ability and mid-year and final-test means for U. S. third-grade pupils of average ability and fourth-grade high and average ability pupils were lower at both testing periods. Also, the mid-year mean U. S. high ability fifth-graders was lower. On the final-test period high ability fifth-grade U. S. and British Isles pupils obtained the same mean. The U. S. mean was higher on reading comprehension at both mid-year and final-test periods for pupils of average ability fifth-grade and both high and average ability sixth-grade.

Table 53
Mid-Year And Final Test Means For Reading Vocabulary And Comprehension
Grades 3 - 6, Public Schools

		Vocabulary				Comprehension			
		U. S.		Br. Is.		U. S.		Br. Is.	
Grade	Ability	Mid-Yr.	Final	Mid-Yr.	Final	Mid-Yr.	Final	Mid-Yr.	Final
3	High	29.7	31.8	32.7	34.7	38.4	44.6	39.0	43.9
	Average	19.9	25.9	26.9	30.2	27.2	34.0	29.8	34.7
4	High	38.8	40.3	41.5	45.5	49.5	53.4	54.5	57.4
	Average	29.0	30.9	30.5	34.5	34.7	40.9	37.5	42.7
5	High	41.7	42.7	44.4	45.1	57.0	60.2	58.9	60.2
	Average	35.4	37.1	37.6	39.3	45.5	50.5	45.2	50.2
6	High	42.0	45.3	41.9	46.9	55.9	61.6	53.6	56.8
	Average	31.9	33.2	32.8	35.2	39.5	45.5	37.0	38.5

Table 54 presents the F-ratios for the variables of reading vocabulary and comprehension. Significant F-ratios were obtained on the variable of reading vocabulary for the main effects of country and ability and the interactions of grade by ability and grade by country. The adjusted means for the main effect of country were 34.6 for U. S. and 36.0 for British Isles, indicating a significant difference in gain favoring the U. S. The adjusted means for the main effect of ability were: 36.7, high ability; and 34.6, average ability, indicating a significant difference in gain favoring the high ability pupils. Figure 60 and 61 present the interactions of grade by country and grade by ability-respectively. The interaction of grade by country, Figure 60, probably occurred because of the pattern of adjusted means with a cross-over from grades three to four wherein the U. S. adjusted mean at grade three had been higher but became lower at grade four with convergence at grade five and a wider difference again at grade six. The interaction of grade by ability, Figure 61, on the variable of reading vocabulary probably occurred because of the same pattern as existed for the interaction of grade by country, namely, cross-over of adjusted means from grade three to four with a changing pattern at grades five and six, wherein the adjusted mean for U. S. at third grade was lower than British Isles and became higher at grades four, five, and six.

Table 54 contains the F-ratios for the variable of reading comprehension. Significant F-ratios were obtained for the main effects of country and ability and for the interaction of grade by country. The adjusted means for the main effect of country were 46.2, U. S.; and 44.3, British Isles, indicating a significant difference in gain favoring U. S. The adjusted means for the main effect of ability were 47.0, high ability; and 45.2, average ability, indicating a significant difference in gain favoring high ability. Figure 62 presents graphically the probable cause of the grade by country interaction on reading comprehension. The greater difference in adjusted means at sixth-grade than was the case at fifth-and fourth-and third-grade was the probable cause of the interaction.

Table 54
F-Ratios From the Analysis of Covariance, Reading Vocabulary, And Comprehension
Grades 3 - 6, Public Schools

Source of Variation	Degrees of Freedom	Vocabulary	Comprehension
Grade	3	----	1.84
Country	1	14.28**	14.04**
Ability	1	20.73**	7.26**
Grade & Country	3	3.74*	5.03**
Grade & Ability	3	7.06**	2.17
Country & Ability	1	----	---
Grade & Country & Ability	3	----	---
Within	1082		

*p $< .05$
**p $< .01$

Figure 60

Interaction of Means For Reading Vocabulary by Grade And Country

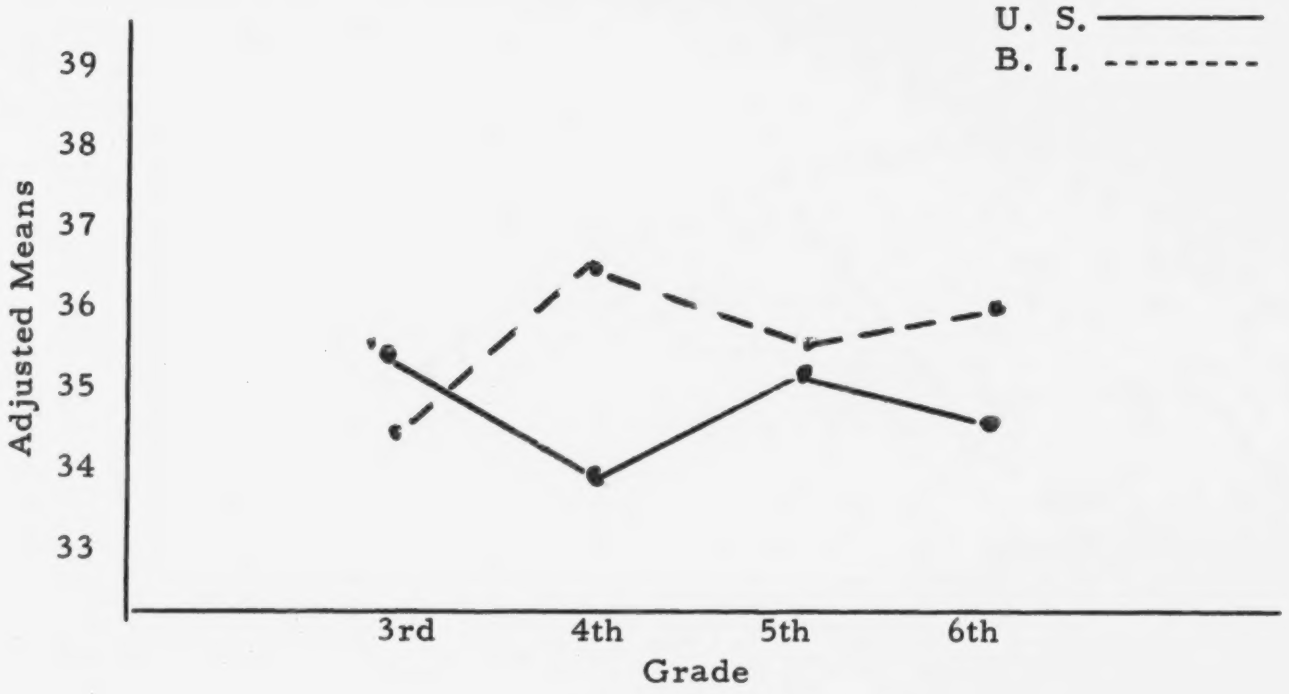


Figure 61

Interaction of Means For Reading Vocabulary by Grade And Ability

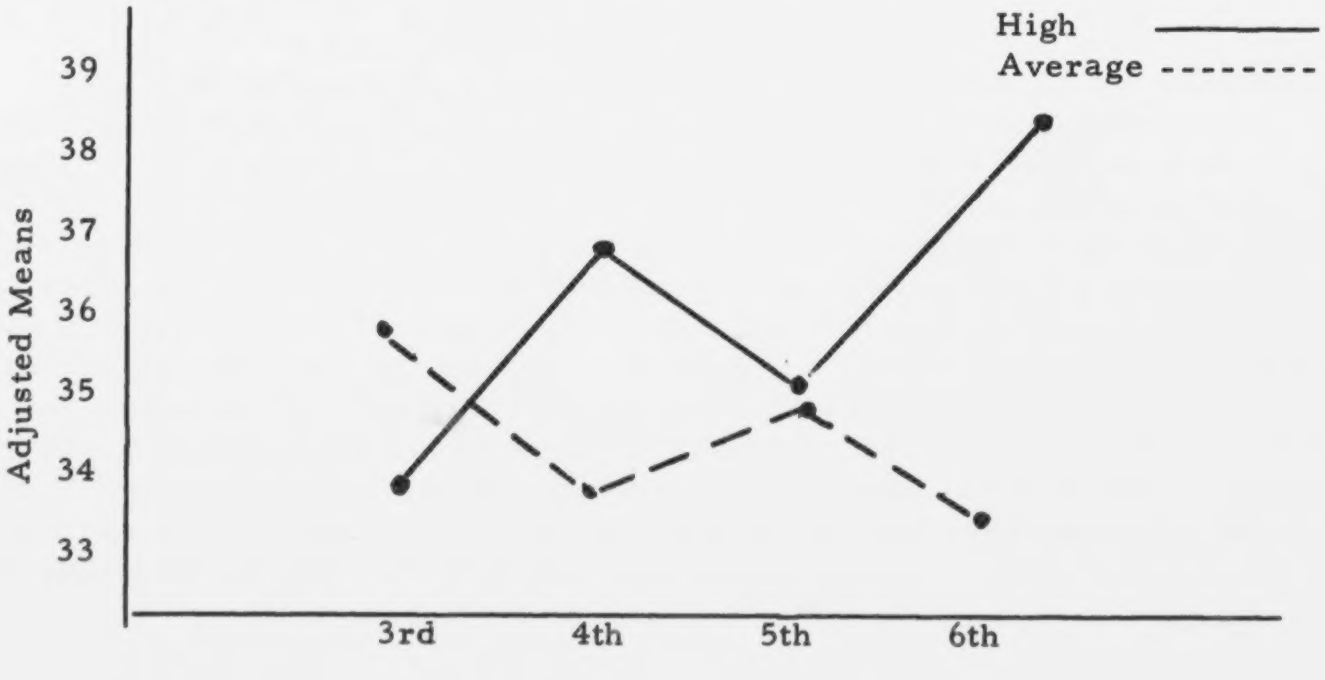


Figure 62
Interaction of Means For Reading Comprehension by Grade And Country

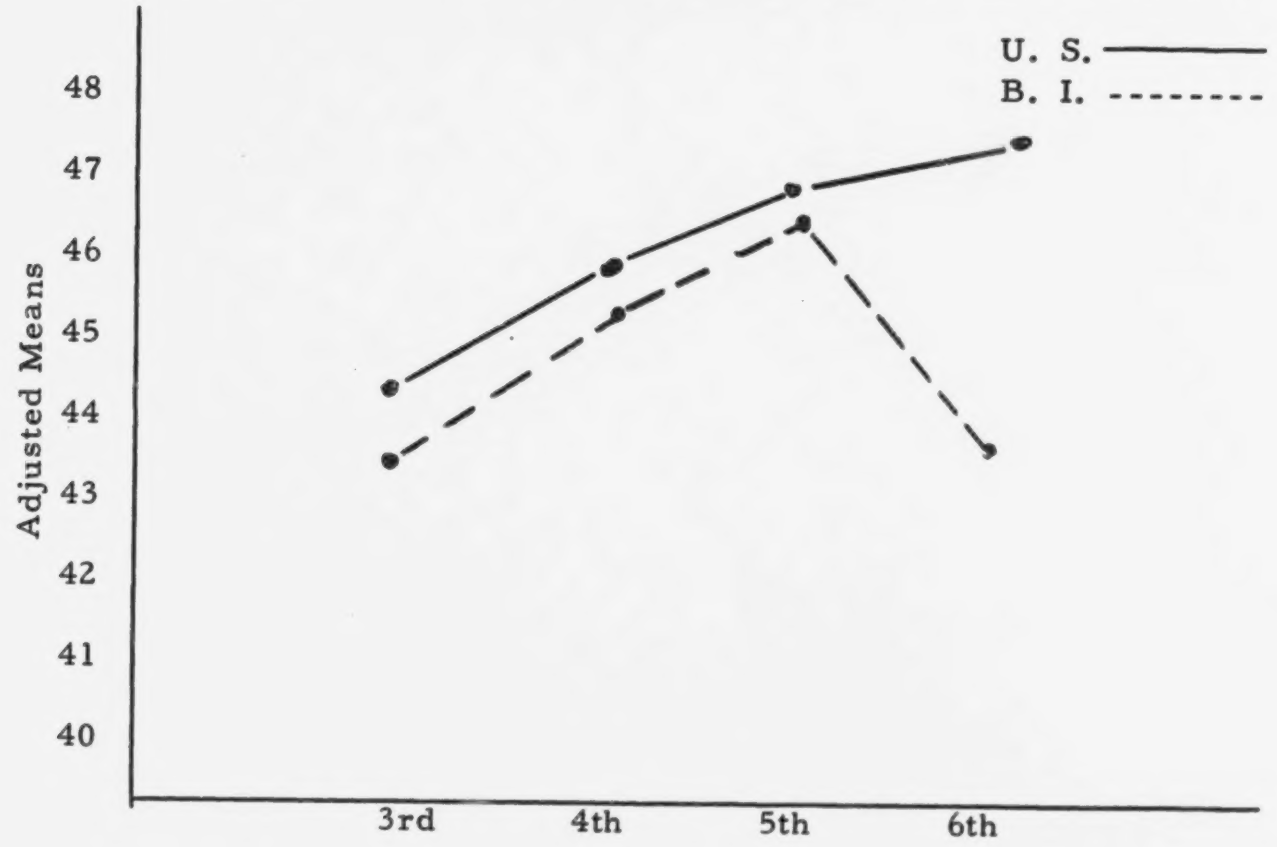


Table 55 presents the mid-year and final-test means for the variables of arithmetic reasoning and fundamentals for U. S. and British Isles pupils grades three to six located in public schools. On the variable of arithmetic reasoning, both the mid-year and final-test means for U. S. pupils of both high and average ability grades three and four and at mid-year for high ability fifth-grade the means were lower than for corresponding British Isles pupils of high and average ability grades three and four and high ability grade five. The means on final-test period for U. S. high ability fifth-grade pupils and for both mid-year and final-test periods for average ability fifth-grade and high and average ability sixth-grade pupils were higher than means for British Isles pupils at the final-test period of high ability fifth-grade and mid-year and final-test periods for average ability fifth-grade and high and average ability sixth-grade pupils on the variable of arithmetic reasoning.

Table 55

Mid-Year And Final-Test Means For Arithmetic Reasoning And Fundamentals
Grades 3 - 6, Public Schools

		Reasoning				Fundamentals			
		U. S.		Br. Is.		U. S.		Br. Is.	
Grade	Ability	Mid-Yr.	Final	Mid-Yr.	Final	Mid-Yr.	Final	Mid-Yr.	Final
3	High	21.3	25.8	25.0	26.8	17.0	24.9	29.6	32.4
	Average	16.8	21.3	19.3	22.9	15.6	21.9	24.3	27.0
4	High	28.4	30.5	32.0	34.7	31.8	34.2	44.5	51.0
	Average	23.0	26.1	24.1	26.9	26.6	29.7	31.9	36.3
5	High	33.8	36.2	34.0	35.7	43.3	49.4	57.6	57.5
	Average	29.0	31.3	29.0	30.7	34.7	39.5	43.0	48.1
6	High	31.0	35.8	30.6	33.9	49.4	58.5	58.7	61.1
	Average	23.9	26.9	21.4	23.7	39.3	47.1	41.0	43.0

On the variable of arithmetic fundamentals, Table 55, both mid-year and final-test means for U. S. pupils of high and average ability grades three, four, and five, and high ability sixth-grade, and mid-year testing means for average ability sixth-grade were lower than corresponding British Isles pupils of high and average ability at grades three, four, five, and six. Sixth-grade U. S. pupils of average ability obtained a higher mean on the final-testing period than did the British Isles average ability sixth-grade pupils.

Table 56 presents the F-ratios for the variables of arithmetic reasoning and fundamentals. A significant F-ratio was obtained for the main effect of ability on the variable of arithmetic reasoning and a significant F-ratio on the interaction of grade and ability. The adjusted means for the main effect of ability were 29.4, high ability; and 27.4, average ability, indicating a significant difference in gain favoring high ability. Figure 63 graphically presents the probable cause of the interaction of grade by ability on the variable of arithmetic reasoning. The probable cause of the interaction being the difference in adjusted means at grades five and six in comparison to the differences that existed at grades three and four. Significant F-ratios were obtained on the main effects of grade and country and ability and the interaction of grade by country on the variable of arithmetic fundamentals, Table 56. The adjusted means for the main effect of grade were: third grade, 38.2; fourth, 37.4; fifth, 39.6; and sixth grade, 41.3. The adjusted means for the main effect of country were 39.7, U. S., and 38.2, British Isles, indicating a significant difference in gain favoring U. S. The adjusted means for the main effect of ability were 40.2, high ability; and 38.9, average ability, indicating a significant difference in gain favoring high ability. Figure 64 graphically presents the probable cause of the grade by country interaction on the variable of arithmetic fundamentals. The probable cause of the interaction was the cross-over of adjusted means; third grade U. S. adjusted mean higher than British Isles but lower at fourth grade but again crossing over at grade five with the difference becoming larger at grade six.

Table 56
F-Ratios From The Analysis of Covariance, Arithmetic Reasoning And Fundamentals Grades 3 - 6, Public Schools

Source of Variation	Degrees of Freedom	Reasoning	Fundamentals
Grade	3	1.78	11.00**
Country	1	2.93	7.05**
Ability	1	24.84**	4.31*
Grade & Country	3	1.95	15.05**
Grade & Ability	3	4.25**	---
Country & Ability	1	----	---
Grade & Country & Ability	3	----	2.35
Within	1082		

**$p < .01$

Figure 63

Interaction of Means For Arithmetic Reasoning by Grade And Ability

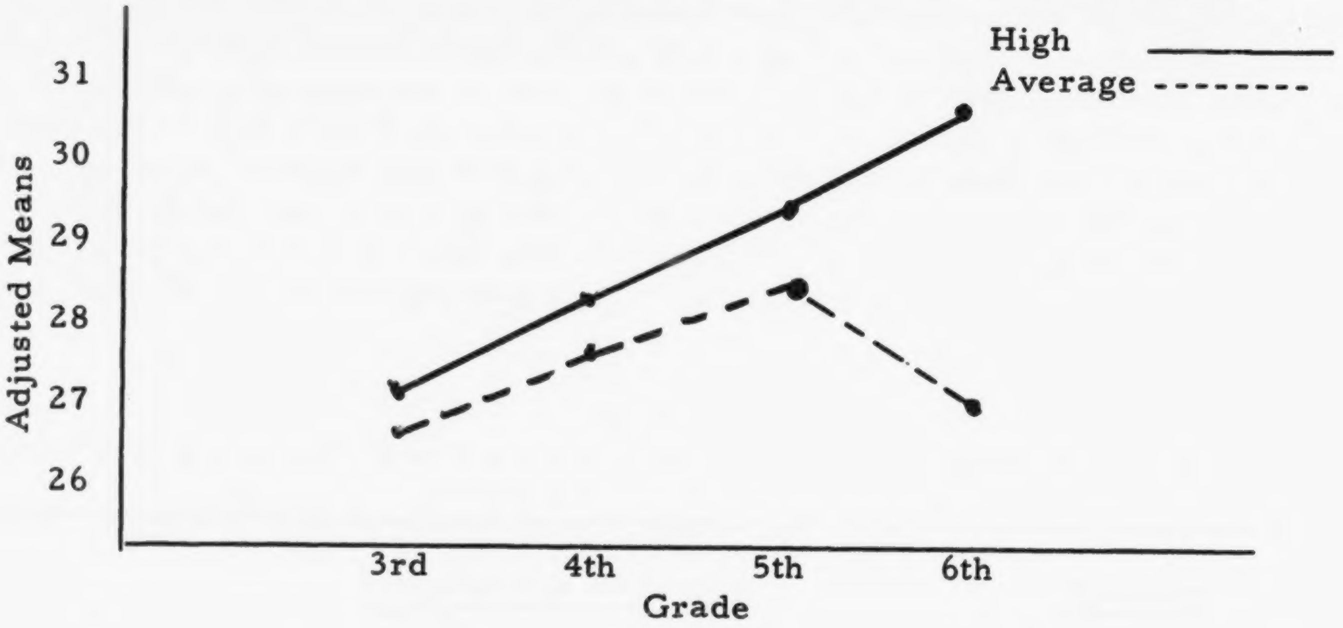


Figure 64

Interaction of Means For Arithmetic Fundamentals by Grade And Country

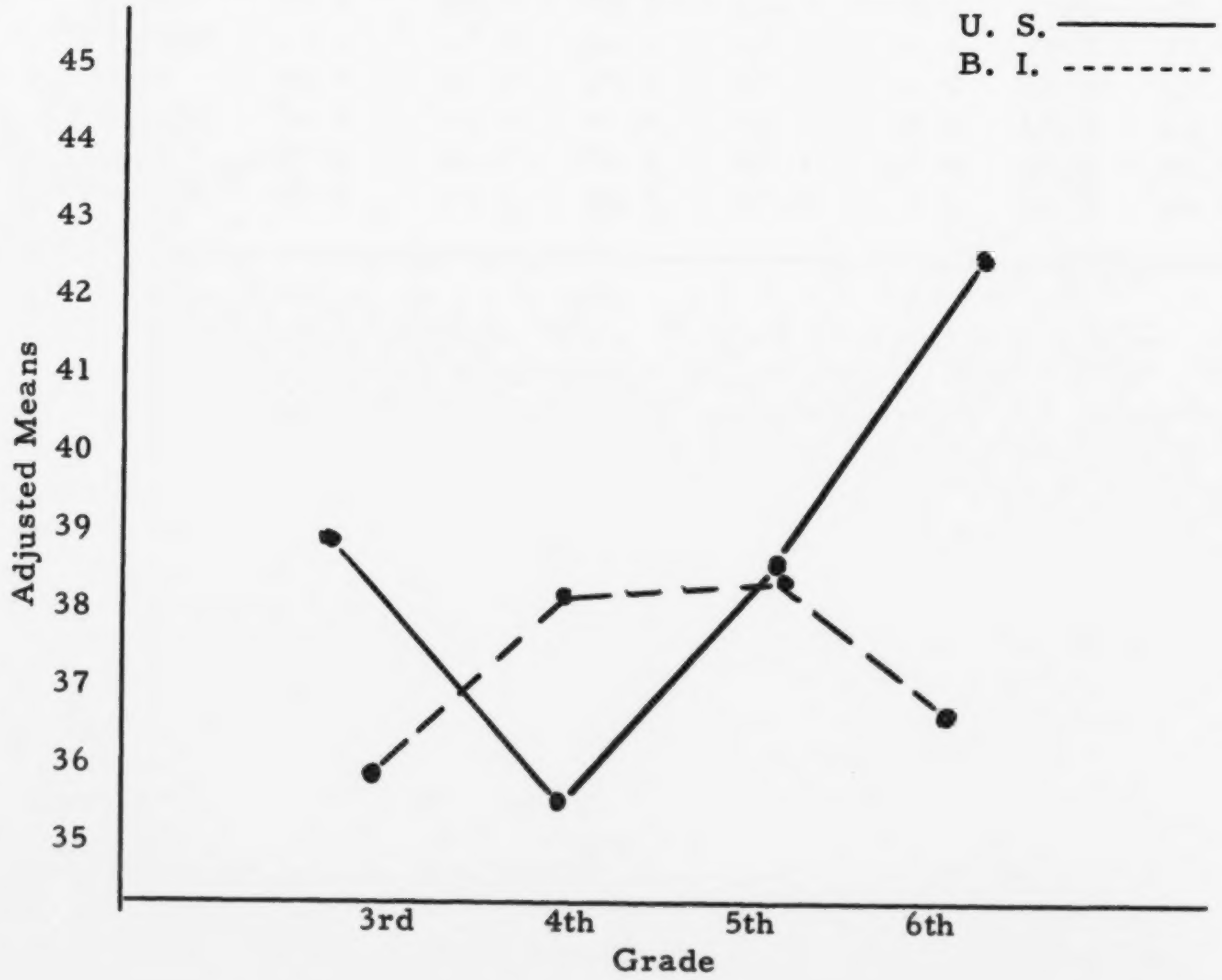


Table 57 presents the mid-year and final-test means for the variables of mechanics of English and spelling for U. S. and British Isles pupils in grades three to six public schools. At mid-year the means for the third-grade U. S. pupils of high and average ability and high ability fourth-and fifth-grade were lower than corresponding British Isles means for pupils, at mid-year, of high and average ability third-grade and high ability fourth-and-fifth-grade; also, on this variable, mechanics of English, the final-test means were lower for U. S. than British Isles pupils of high ability fourth-grade. In every other instance at both mid-year and final-test periods the U. S. mean was higher than the British Isles mean for respective ability and grade levels.

Table 57
Mid-Year And Final Test Means For Mechanics of English And Spelling, Grades 3 - 6, Public Schools

		Mechanics of English				Spelling			
		U. S.		Br. Is.		U. S.		Br. Is.	
Grade	Ability	Mid-Yr.	Final	Mid-Yr.	Final	Mid-Yr.	Final	Mid-Yr.	Final
3	High	57.5	70.9	61.9	67.3	14.8	16.3	19.0	19.0
	Average	44.8	56.7	46.8	54.7	10.9	13.6	14.6	16.2
4	High	78.8	83.4	79.9	85.2	19.0	19.8	22.7	24.0
	Average	60.9	67.4	58.1	65.2	15.1	16.1	17.9	19.7
5	High	88.2	90.8	89.2	87.5	22.6	23.6	23.3	19.6
	Average	74.5	80.6	73.0	76.7	18.6	24.4	21.7	20.8
6	High	81.7	86.7	79.5	81.9	20.4	21.2	22.5	17.4
	Average	67.5	73.6	60.0	63.0	16.1	24.2	17.0	17.2

On the variable of spelling, Table 57, both the mid-year and final-test means for the U. S. pupils were lower than the British Isles means at both third-and fourth-grades and fifth-and sixth-grades at mid-year testing; however, the final-test means for U. S. high and average fifth-and sixth-graders pupils were higher than for British Isles high and average fifth-and sixth-grade pupils.

Table 58 presents the F-ratios for the variables of mechanics of English and spelling for pupils in grades three to six, public schools. Significant F-ratios were obtained for the main effects of country and ability on the variable of mechanics of English. The adjusted main effect means for country were: 72.8, U. S.; and 70.1, British Isles, indicating a significant difference in gain favoring U. S. The adjusted means for the main effect of ability were 73.6, high ability; and 71.5, average ability, indicating a significant difference in gain favoring high ability pupils on the variable of mechanics of English. No other F-ratios on this variable were significant.

Table 58 also indicates that the F-ratios for the main effect of ability and the grade by country interaction were significant on the variable of spelling. Neither grade nor country main effect F-ratios were statistically significant. The adjusted main effect means for ability were 19.1, high ability; and 18.0, average ability, indicating a significant difference in gain favoring high ability. Figure 65 graphically presents the probable cause of the grade by country interaction for spelling. The interaction probably occurred because of the crossover of means at grade four and grade five wherein the U. S. adjusted mean grade three was higher than British Isles but lower at fourth grade and crossing over to a higher position again at grade five.

Table 58

F-Ratios From The Analysis of Covariance, Mechanics of English And Spelling, Grades 3 - 6, Public Schools

Source of Variation	Degrees of Freedom	Mechanics of English	Spelling
Grade	3	1.24	----
Country	1	15.36**	----
Ability	1	5.89*	11.20**
Grade & Country	3	3.01	4.04**
Grade & Ability	3	1.16	1.13
Country & Ability	1	----	2.01
Grade & Country & Ability	3	----	----
Within	1082		

*$p < .05$
**$p < .01$

Figure 65
Interaction of Means For Spelling by Grade And Country

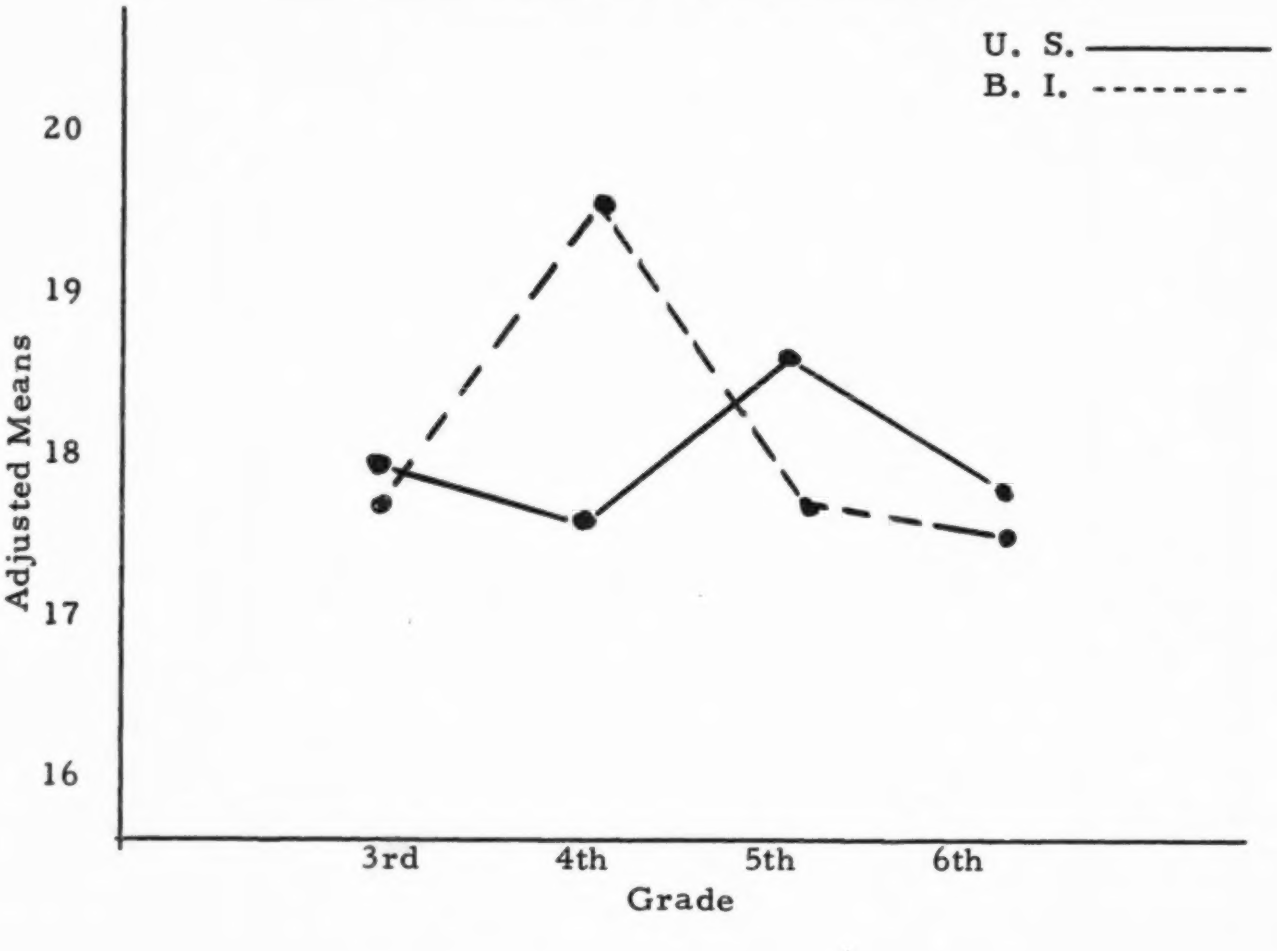


Table 59 presents a summary of the significant F-ratios for the main effects of grade, country, and ability and their interactions that were obtained for the variables of reading, arithmetic, and English usage for public school pupils grades three to six. It should be recalled that the F-ratios from the analysis of covariance, wherein the final test means were adjusted--taking into consideration the means on the mid-year testing, may be interpreted as being a gain in mean performance from mid-year to final-test period. Inspection of Table 57 indicates that the main effect for grade was significant for only one variable, namely, arithmetic fundamentals. Significant main effects of country were obtained on the variables of reading vocabulary, reading comprehension, arithmetic fundamentals, and mechanics of English. These significant main effects indicated a significant difference in gains favoring British Isles on the variable of reading vocabulary and favoring U. S. on the variables of reading comprehension, arithmetic fundamentals and mechanics of English. A significant main effect for ability was obtained on all six variables indicating a significant difference in gain favoring high ability pupils on each variable. The presence of significant interactions necessitated caution in interpretation of the main effects for which interactions were significant.

Table 59

Summary of Significant Main Effects[1] And Interactions For Variables of Reading, Arithmetic And English Usage, Grades 3 - 6, Public Schools, 2nd - 3rd Testing Period

	Reading Vocabulary	Reading Compre.	Arithmetic Reasoning	Arithmetic Fundamentals	Mechanics of English	Spelling
Grade				Sig.		
Country	B. I.	U. S.		U. S.	U. S.	
Ability	H	H	H	H*	H*	H
Grade & Country	Sig.*	Sig.		Sig.		Sig.
Grade & Ability	Sig.		Sig.			
Country & Ability						
Grade & Country & Ability						

*$p < .05$

[1] All F-ratios are significant at the .01 level except where asterisk denotes .05 level

(5) Summary of Results-Mid-Year And Final-Testing Periods

In summary no significant F-ratios were found on either of the six variables for the main effects of grade or country for pupils in first and second grade in private schools. However, significant F-ratios were found for the main effect of ability indicating that high ability pupils obtained a significantly greater gain than low ability pupils on the variables of reading vocabulary, reading comprehension, and mechanics of English. For pupils in private schools grades three to six significant F-ratios were obtained for the main effect of grade on the variables of reading vocabulary, reading comprehension, arithmetic reasoning, arithmetic fundamentals, and spelling. Also, for pupils in grades three to six private schools, British Isles gained significantly higher means on the variables of reading vocabulary, reading comprehension and spelling. Significant F-ratios were also obtained on the main effect of ability for pupils in private schools grades three to six indicating significant gain in favor of high ability pupils on the variables of reading vocabulary, reading comprehension, arithmetic reasoning, arithmetic fundamentals, and mechanics of English.

A different pattern was observed for public school pupils. As noted above, no significant differences were obtained, indicating no significant difference in gain, for private school pupils grades one and two or between British Isles and U. S. on any of the six variables. However, for public school pupils, grades 1 - 2, significant grade main effects were obtained indicating significant gain favoring second-grade on the variables of reading comprehension, arithmetic reasoning, mechanics of English and spelling. Also, as noted above, significant F-ratios were obtained for the main effect of grade for pupils in grades three to six in private schools on five of the six variables whereas a significant F-ratio was obtained only on the variable of arithmetic fundamentals for pupils in grades three to six, public schools. Where significant F-ratios did occur for the main effect of country, British Isles was higher on variable of reading vocabulary, reading comprehension, and spelling for private school pupils grades three to six. For public school pupils, grades three to six, the British Isles gained significantly more than U. S. on the variable of reading vocabulary. However, the difference in means significantly favored U. S. pupils grades three to six public schools on the variables of reading comprehension, arithmetic fundamentals, and mechanics of English. Also, U. S. gained significantly more on the variables of reading vocabulary, reading comprehension, arithmetic reasoning, and arithmetic fundamentals for public schools pupils grades one and two. Significant F-ratios were also obtained on the main effect of ability for public school pupils grades one and two. High ability public pupils grades 3 - 6, gained significantly more than average ability pupils on all seven variables whereas spelling was the only variable where this did not occur for private school pupils grades three to six.

C. Summary of Pupil Achievements, California (U. S.) Achievement Series

Tables 60, 61, and 62 present summaries of pupil achievement wherein total number of rights on the two sub-scores for each of the subject matter areas, reading, arithmetic, and English usage have been combined to present a total score. For continuity purposes. third grade scores, on the 3 and 4 battery, and sixth grade scores on the Junior high battery have been converted to scores on the 4, 5, and 6 battery.

Table 60 presents total reading achievements in all categories, grades one thru six. The previous analysis reported the British Isles pupils most frequently achieved the higher results for vocabulary and the United States pupils for comprehension. However, total reading scores consistently favor the British Isles in all categories, except the average private school pupils, until the six grade level.

Table 61 presents total arithmetic achievements in all categories, grades one thru six. The previous analysis reported the British Isles pupils consistently achieved the higher results in the sub-tests of fundamentals while the United States pupils more frequently achieved the higher results in the sub-tests of arithmetic reasoning. In total results, the British pupils achieved higher with isolated exceptions in the 1st and 2nd grade lower ability pupils and 3rd and 5th grade average ability private school pupils.

Table 62 presents total English usage achievements in all categories, grades one thru six. The previous analysis indicated that British Isles pupils achieved the higher results in all categories in the sub-test of spelling. In the sub-test of mechanics of English, however, the United States pupils tend to achieve the higher from the third grade level one through the sixth. In total results, British Isles pupils more frequently achieved the higher means at the first and second grade level but at the fifth and sixth grade level the reverse was true.

TABLE 60

PUPIL ACHIEVEMENT IN READING

		High Ability				Average Ability				Low Ability	
	Testing	U. S.		B. I.		U. S.		B. I.		U. S.	B . I.
Grade	Period	Public	Private	Public	Private	Public	Private	Public	Private	Public	
I	(1)	31.3	39.5	60.3	59.7	25.7	29.1	39.9	35.2	28.6	24.4
	(2)	51.4	65.9	75.4	81.0	43.8	56.2	57.1	59.4	46.1	37.6
	(3)	69.4	74.7	82.0	81.8	61.3	62.2	66.0	62.0	62.2	45.5
II	(1)	73.0	77.0	71.1	74.3	62.6	58.1	64.2	64.6	56.1	57.1
	(2)	80.5	84.0	82.2	82.9	72.0	74.6	77.3	75.9	70.3	73.9
	(3)	84.9	84.2	86.0	82.9	79.5	77.8	78.4	77.3	77.3	77.1
III	(1)	56.2	60.0	57.3	61.4	41.2	35.6	46.9	48.4		
	(2)	68.1	71.8	71.7	73.0	47.1	64.8	56.7	61.3		
	(3)	76.4	84.4	77.9	91.2	59.9	74.2	65.0	71.4		
IV	(1)	65.8	91.5	90.1	91.5	52.9	68.3	59.3	51.7		
	(2)	88.3	100.6	96.0	96.8	63.7	80.2	68.0	73.1		
	(3)	93.7	113.5	102.9	100.2	71.8	84.4	77.6	80.1		
V	(1)	90.0	97.7	97.2	88.7	68.9	81.6	68.0	63.3		
	(2)	98.7	104.1	103.3	104.3	80.9	92.2	82.8	80.0		
	(3)	102.9	107.2	105.3	108.4	87.6	96.7	89.6	85.3		
VI	(1)	105.3	102.2	99.5	104.6	83.3	85.3	86.9	83.2		
	(2)	113.0	112.0	113.0	112.0	96.0	97.0	94.0	97.0		
	(3)	118.0	116.0	118.0	118.0	101.0	101.0	97.0	104.0		

TABLE 61

PUPIL ACHIEVEMENT IN ARITHMETIC

		High Ability				Average Ability				Low Ability	
		U. S.		B. I.		U. S.		B. I.		U. S.	B. I.
Grade	Testing Period	Public	Private	Public	Private	Public	Private	Public	Private	Public	Public
I	(1)	23.1	42.5	58.2	56.0	17.7	25.3	38.5	43.4	22.0	16.9
	(2)	49.3	61.0	73.6	72.1	43.1	47.6	58.2	57.3	39.7	39.1
	(3)	68.8	71.2	77.9	79.0	58.9	59.0	67.3	61.8	59.2	43.3
II	(1)	71.6	71.8	69.1	74.6	62.0	60.6	67.1	60.6	64.7	56.2
	(2)	78.3	80.2	80.2	79.2	73.1	72.7	75.0	72.6	68.3	72.6
	(3)	82.6	82.9	82.7	81.3	77.5	76.3	79.2	78.9	77.2	72.3
III	(1)	33.6	39.7	40.6	39.5	25.5	31.8	32.9	29.2		
	(2)	38.3	49.6	54.6	46.4	32.4	29.4	43.9	42.8		
	(3)	50.7	51.7	59.3	56.9	43.2	38.0	49.9	50.9		
IV	(1)	49.6	56.1	68.5	59.3	40.3	43.2	50.9	44.2		
	(2)	60.2	68.0	76.5	76.9	49.6	55.5	56.0	58.2		
	(3)	64.8	74.2	85.7	80.9	55.8	61.9	63.2	64.7		
V	(1)	65.5	68.2	73.6	67.6	55.3	60.6	55.9	54.3		
	(2)	77.1	79.6	87.6	92.8	63.7	67.2	62.1	67.5		
	(3)	85.6	91.3	93.2	96.7	70.8	74.5	78.8	72.1		
VI	(1)	78.4	88.8	85.1	88.0	68.3	69.4	69.8	69.2		
	(2)	93.0	97.0	103.0	103.0	84.0	77.0	88.0	85.0		
	(3)	105.0	104.0	117.0	111.0	90.0	87.0	90.0	88.0		

TABLE 62

PUPIL ACHIEVEMENT IN ENGLISH USAGE

		High Ability				Average Ability				Low Ability	
	Testing	U. S.		B. I.		U. S.		B. I.		U. S.	Br. I.
Grade	Period	Public	Private	Public	Private	Public	Private	Public	Private	Public	
I	(1)	24.4	30.1	47.0	36.2	19.6	20.9	35.7	20.9	17.8	20.5
	(2)	38.7	46.8	61.2	43.3	33.0	34.2	44.6	33.9	32.3	30.2
	(3)	51.1	55.0	67.5	59.0	42.9	42.1	51.7	41.8	40.1	39.2
II	(1)	44.3	60.0	55.6	56.9	42.1	36.8	47.5	44.0	33.8	32.9
	(2)	60.2	63.8	68.2	70.2	55.6	50.1	59.1	54.8	54.0	48.3
	(3)	68.1	69.2	70.7	71.7	63.6	56.5	63.4	65.9	60.3	52.3
III	(1)	54.6	58.0	58.9	59.2	41.5	45.2	49.1	55.8		
	(2)	62.7	76.3	80.9	71.8	55.7	58.2	61.4	63.1		
	(3)	87.2	86.5	86.3	86.7	70.3	80.0	70.9	79.6		
IV	(1)	83.2	99.2	98.4	87.7	61.0	73.7	66.1	64.6		
	(2)	97.8	110.6	102.6	105.8	76.0	90.4	76.0	64.6		
	(3)	103.2	112.1	109.2	108.9	83.5	95.1	84.9	85.7		
V	(1)	97.8	107.8	103.6	89.8	82.5	88.8	75.1	67.7		
	(2)	110.8	117.3	112.5	108.3	93.1	104.7	94.7	82.0		
	(3)	114.4	118.0	113.1	113.2	100.2	109.6	97.5	88.3		
VI	(1)	116.7	108.0	110.5	110.4	97.9	94.2	85.5	96.2		
	(2)	126.0	121.0	124.0	122.0	101.0	110.0	99.0	112.0		
	(3)	128.0	124.0	127.0	128.0	114.0	114.0	104.0	113.0		

D. Results of Mid-Year And Year End Testing With Standardized British Tests

Randomly selected groups of pupils were also administered tests developed and published by the National Foundation For Educational Research in England and Wales. The instruments themselves have been previously described in Chapter IV, pg. 34. Items were eliminated from these tests that would not be clear to the United States pupils so results are again reported on the basis of correct responses to scored items only. It should be noted that none of the British Tests were designed for measuring pupil attainment at the first grade level. It should also be pointed out that with the exception of the Sentence Reading Tests the British Tests were designed for a range of usually one and no more than two grade levels. These tests results are reported for the two testing periods of mid-year and year end.

(1) Sentence Reading

Table 63 reports the results of pupil attainments on the English Sentence Reading Tests for the mid-year and year-end testing periods.

Table 63
Pupil Achievement-English Sentence Reading

	High Ability				Avg. Ability			
	U. S.		B. I.		U. S.		B. I.	
	Public	Pvt.	Public	Pvt.	Public	Pvt.	Public	Pvt.
Grade I-(1)								
(2)			Test Not Applicable					
Grade II-(1)	9.0	12.5	13.2	12.6	5.4	5.4	9.8	9.9
(2)	11.8	15.6	16.0	15.8	8.6	8.7	10.6	10.6
Grade III								
-(1)	16.9	17.2	18.3	20.0	15.0	16.2	16.5	17.1
-(2)	19.0	20.1	22.1	25.2	17.1	18.3	18.9	19.8
Grade IV								
-(1)	22.4	26.4	26.8	26.6	18.5	20.2	19.6	22.0
-(2)	24.6	27.3	27.7	27.5	21.7	24.8	22.7	25.4
Grade V-(1)	25.4	28.7	29.2	29.3	24.5	26.3	26.2	25.9
-(2)	29.8	30.1	30.1	30.8	27.9	28.6	28.9	28.4
Grade VI								
-(1)	31.9	31.2	32.3	32.4	30.0	30.5	29.1	30.7
-(2)	32.4	32.3	33.0	33.1	30.8	31.1	29.6	32.2

As may be noted in Table 63, pupils in the British sample scored consistently higher at each level with isolated exceptions in the 5th grade average public and 6th grade average private categories. The degree of superiority was less marked in the upper primary grades.

(2) Arithmetic Progress

Table 64 presents the mean achievements of second grade pupils, on the mechanics of arithmetic tests, form 2A and 2B.

Table 64
Mean Achievement of 2nd Grade Pupils, Mechanics of Arithmetic Test

	High Ability				Average Ability				Low Ability			
Test	U. S.		B. I.		U. S.		B. I.		U. S.		B. I.	
Per.	Pub.	Pvt.	Pub.	Pvt.	Pub.	Pvt.	Pub.	Pvt.	Pub.	Pvt.	Pub.	Pvt.
(1)	19.8	19.7	22.4	22.1	11.8	12.0	13.7	13.7	9.0	---	10.1	---
(2)	24.6	24.6	27.3	26.9	15.9	15.6	17.7	17.4	11.2	---	12.5	---

As may be noted, British pupils achieved higher in all categories for both testing periods. Differences, as anticipated, occurred between ability groupings.

Table 65 presents the mean achievement of pupils on the arithmetic progress series, forms A-1, B-1, and C-1, administered to pupils in grades three, four, five, and six respectively. Except between grades 4 and 5, where test form B-1 was used, comparisons between grade levels by achievement means are not meaningful, due to different forms used and the delition of items of bias.

Table 65
Mean Achievement of 3rd, 4th, 5th and 6th Grade, Arithmetic Progress Tests

		High Ability				Average Ability			
	Test	U. S.		B. I.		U. S.		B. I.	
Grade	Per.	Pub.	Pvt.	Pub.	Pvt.	Pub.	Pvt.	Pub.	Pvt.
					Test A-1				
III	(1)	9.8	9.7	14.2	13.5	4.0	3.6	6.3	6.1
	(2)	12.9	12.4	18.8	17.5	4.2	4.1	7.9	7.7
					Test B-1				
IV	(1)	6.8	7.1	12.3	12.1	5.5	5.6	6.8	7.0
	(2)	10.0	11.2	17.3	16.9	8.4	8.8	10.5	10.6
V	(1)	12.9	14.8	19.7	20.1	8.4	9.3	13.5	12.3
	(2)	16.6	19.7	22.0	23.6	13.7	14.9	18.3	17.4
					Test C-1				
VI	(1)	15.7	16.4	21.7	19.9	12.2	11.9	13.3	12.8
	(2)	20.1	20.0	26.6	22.4	16.8	15.5	17.1	16.0

At every grade level, public and private, in both the high and average ability categories, the British pupils showed a higher level of attainment.

(3) English Usage

Table 66 reports the results of pupil allowments on the English tests of English Progress for the mid-year and year-end testing periods. Except between grades 2 and 3, comparisons between grade levels by achievement means are not meaningful due to different forms used and the delition of items of bias.

Table 66
Mean Achievements of Pupils, Grade Levels 2, 3, 4, 5 and 6, English Progress Series

		High Ability				Aver. Ability				Low Ability			
	Test	U. S.		B. I.		U. S.		B. I.		U. S.		B. I.	
Grade	Per.	Pub.	Pvt.	Pub.	Pvt.	Pub.	Pvt.	Pub.	Pvt.	Pub.	Pvt.	Pub.	Pvt.
					Test A								
II	(1)	21.6	23.2	26.4	26.7	19.9	20.0	21.1	21.8	18.5	---	19.1	---
	(2)	27.4	29.9	32.4	33.1	24.8	24.6	25.2	26.3	23.3	---	23.5	---
III	(1)	36.7	37.1	42.3	41.8	34.3	34.3	34.3	36.2				
	(2)	41.1	41.3	47.0	47.4	38.0	37.7	38.1	40.7				
					Test B								
IV	(1)	32.8	34.4	34.7	33.6	29.9	30.3	29.9	30.5				
	(2)	34.5	36.5	38.6	37.9	32.9	33.1	33.7	34.8				
					Test C								
V	(1)	30.7	32.8	33.1	30.8	23.2	24.2	25.0	24.4				
	(2)	39.3	42.1	42.4	42.0	31.2	32.6	32.9	32.1				
					Test D								
VI	(1)	41.2	39.4	41.6	41.7	34.0	32.4	34.3	35.9				
	(2)	48.2	46.5	48.8	49.6	39.1	38.7	40.0	42.2				

An inspection of Table 66 indicates the British means are higher for every classification with the exception of 5th grade private school and sixth grade public school pupils. It can be noted that the margin of difference did lessen considerably for the upper primary grades however.

In summary, on all the British standardized tests, even after the removal of bias items from scoring, the British pupils consistently out-achieved their United States counterparts. However, with the exception of arithmetic, the margin of difference did lessen for the upper primary grades.

E. Correlations Between The United States And British Tests

To obtain an estimate of the validity of the U. S. tests for determining the achievement levels of British pupils, within the framework of this study, correlation coefficients for U. S. and British achievement tests were computed for randomly selected classes of British and American pupils.

Pearson Product-Moments were obtained for total scores on the reading, arithmetic or English sub-test of the California Achievement Test and the corresponding British-published subject matter test. Total scores for the

California subject area tests were used rather than scores for individual sections of these sub-tests, i.e., spelling, arithmetic fundamentals, et cetera, since the British tests are constructed to report total scores only.

As the major findings and conclusions of this study are based upon the relative performance by British and American pupils on the modified California Achievement Test, the validity of this instrument for use with British pupils is of paramount importance.

A comparison of Tables 67 and 68 indicates that the performance of the British pupils on the two tests was much more consistent than the performance of the American children on these two instruments. Thus, it would appear that the American children had greater difficulty with the British prepared tests than did the British children with the American prepared tests. The only exception to this finding was the performance on the test of English Usage, and while the obtained r's in this area for the American children were higher than those obtained for the British children, the r's for the British sample were each sufficiently large to indicate substantial concurrent validity between the American and British tests.

In view of the relatively high relationship between their performance on the American and British tests, it would appear that the British pupils were not being unfairly or invalidly assessed by the American made instruments. The relatively greater difficulty experienced by the American pupils with the British instruments probably resulted from the British tests being presented without any adjustments for cultural differences, whereas the American tests, as used by both populations, were modified to some extent for the British children.

Table 67
Product Moment Correlation Coefficients, British and American Tests, U. S. Pupils

Grade Level	Reading	Arithmetic	English Usage
2	.43	.47	.87
3	.48	.29	.63
4	.58	.45	.80
5	.64	.43	.76
6	.76	.55	.84

Table 68
Product Moment Correlation Coefficients, British and American Tests, Brit. Pupils

Grade Level	Reading	Arithmetic	English Usage
2	.70	.64	.56
3	.72	.61	.59
4	.73	.83	.68
5	.71	.76	.69
6	.76	.89	.81

CHAPTER VI. SUMMARY, CONCLUSIONS, IMPLICATIONS, AND RECOMMENDATIONS

A. Summary

The major purpose of this cross-cultural study was to compare the achievement levels of British and United States elementary school students in grades one through six, of varying ability levels, from both private and public schools, at the approximate beginning, middle, and end of an academic year. It was hypothesized that the mean achievement levels of the British sample would be higher for all grade levels than those of the American sample. It was further hypothesized that there would be specific periods during these first six years of education (grades one through six) wherein the measured achievement of British children would significantly differ from achievement demonstrated by American children.

The achievement analyses were based primarily upon scores earned on the California Achievement Test, modified to eliminate culturally biased items. British-constructed standardized achievement tests were also used, primarily as a criterion measure of the concurrent validity of the California Achievement Test. While American students generally tended to score higher on the U. S. tests and British children tended to score higher on the British tests, the validity coefficients for the tests (for comparable subject matter areas) ranged from .56 to .89, thus indicating that the achievement patterns of the students were relatively similar on the American and British tests.

General summarizations of the mean performance of British and U. S. high and average ability students, from public and private schools, are given in the paragraphs which follow. Insufficient numbers of pupils in the low ability categories necessitated elimination of this ability factor, with the exception of grades 1 - 2, public schools, in order to obtain the largest sample possible and minimize loss of data. It should be noted that the summary is based on an inspection of mean achievement performances on the subject matter sub-tests of the California Achievement Test. The more complex statistical summaries were presented in earlier sections of this report with appropriate tables.

By subject matter area it was found that:

(1) Reading Vocabulary

The British public school pupils earned a higher mean vocabulary test score than did their American counterparts for the first five grades. By the fall testing period of the sixth grade, the mean vocabulary achievement levels were almost identical, and they remained so during the second and third testing periods of the sixth grade. However, the British private school pupils earned noticeably higher mean vocabulary scores than the American private school pupils at two grades only, the first and sixth, with the sixth grade variation occurring at the third testing period only. For all intervening grade levels and testing periods the mean achievement levels on this variable for the two groups were highly similar.

(2) Reading Comprehension

The British six-year-old children had, as anticipated, a much higher mean reading comprehension score than their American peers at the beginning of the first grade. However, the mean achievement score of the U. S. public school pupils exceeded that of the British children by the end of the first grade, and the U. S. private school children exceeded their British counterparts by as early as the midyear tests of the first grade. The mean performance level for the public school pupils of the two countries remained relatively even from grades two through five. At the end of grade six, the U. S. public school, high and average ability pupils' means were slightly higher than that of the British pupils' achievement means. However, this was not true for the private schools. The British high ability private school pupils exceeded their American counterparts. The U. S. average ability private school mean was slightly higher at the end of the sixth grade.

(3) Arithmetic Reasoning

The British public school pupils held a noticeable advantage in mean test performance at the first grade only, with the greatest disparity occurring at the first testing period. The mean performance difference was negligible by the end of the first grade, and the U. S. pupils had slightly higher, although negligible, mean scores by the second grade, first testing period. The two groups maintained almost identical performances throughout grades three through six, with the U. S. pupils attaining slightly higher mean scores by the end of the sixth grade.

The private school pattern was quite similar to the public pattern with the only notable exception being the relatively high U. S. performance on the first test at the first grade level. The U. S. pupils were slightly behind at the first testing period, ahead at the second, and performing at approximately the same level by the end of the year. As was true with the public school pupils, the U. S. held a slight advantage by the end of the sixth grade.

(4) Arithmetic Fundamentals

The British pupils, with only one exception, consistently obtained higher mean performance than did the U. S. pupils in both public and private schools throughout grades one to six. The exception to this was the higher mean test score obtained by the U. S. public school average ability pupils at the final test period at the sixth grade level. The British pupils had markedly higher mean scores on the first tests at the first grade level, and although the U. S. pupils had reduced the disparity between the means to negligible differences by the end of the second grade, the British students again moved ahead in the third grade and in most instances maintained a slightly superior performance throughout grades three to six.

(5) Mechanics of English

The British public school first grade pupils' first testing period mean achievement was markedly higher than the U. S. The disparity was considerably reduced by the end of the first grade, and the U. S. held a slight mean advantage by the end of the third grade. The U. S. advantage was gradually increased and was noticeably greater by the end of the sixth grade.

The U. S. and British private school pupils performed at about the same level on the first test of the first grade level and the means for the two groups stayed approximately similar during the first two and one-half grades. The U. S. third grade pupils earned higher mean scores at the end-of-the-year and maintained this advantage through the fifth grade. However, for the British pupils of high ability mean achievement slightly exceeded the U. S. group at the end of the sixth grade, although the U. S. pupils of average ability continued to retain their advantage throughout the sixth grade.

On the British-prepared, English Progress Series test, the British pupils consistently earned a higher mean score than the U. S. pupils until the sixth grade. At the sixth grade level the means attained for comparable British and U. S. groups were almost identical.

(6) Spelling

The British students from both public and private schools held a considerable spelling advantage on the first test of the first grade and retained this advantage through the first three grades. By the beginning of the fourth grade the U. S. and British private school pupils were achieving at similar levels, and by the beginning of the fifth grade the U. S. and British public school pupils were achieving at similar levels. However, in both private and public schools, the British pupils held slight, although negligible, advantage at the end of the sixth grade.

B. Conclusions, Implications, and Recommendations

In view of the findings as previously described, the following conclusions, implications and recommendations are suggested.

CONCLUSION 1: British pupils were at higher levels of achievement in nearly all the subject matter areas and across ability levels through the first four grade levels.

Implications: Pupils can learn at an earlier age than presently provided for in most United States educational systems. The possibility of earlier kindergarten experiences and the resultant earlier exposure to formal learning needs continued investigations by educators in this country.

Recommendation: It is recommended that further research and possible experimental programs be developed to test the feasibility of earlier school age entry for American pupils. Specifically, it is recommended that

1) research studies investigate the comparative readiness of British and American pre-school youth for school entry and
2) experimental programs be developed wherein homogeneous and/or heterogeneous groups of American pupils be initially enrolled in kindergarten and first grade programs at the ages of four and five respectively.

CONCLUSION 2: By grades five and six, United States pupils were achieving at approximately the same levels in nearly all the tested subject matter areas.

Implications: The earlier pre-school entry by British pupils may be offset by a comparative decline in their rate of achievement as they reach certain maturity levels. Too, there is the suggestion that pupils may learn certain subject matters more rapidly at a more advanced age and with a higher degree of retention. More meaningful curriculum and/or teaching methodology could also influence the levels of achievement. Further, it is possible that the preparation for the 11+ examination during the sixth grade (United States terminology) makes this year of schooling, in the main, for British pupils, one of review.

Recommendation: Additional research investigations are recommended to verify or reject the suggested implications. These would include

1) longitudinal comparative studies of academic achievement;
2) comparative investigations of curriculum and teaching methods;
3) assimilation and application of the findings of previous studies comparing teacher preparation in Great Britain and the United States;
4) assimilation and application of the findings of previous studies conducted in both countries relevant to learning theory and academic achievement in the subject matter and grade levels as investigated in this study.

CONCLUSION 3: On a comparative basis, British pupils were strongest in arithmetic fundamentals and United States' pupils in English usage.

Implication: British schools place more emphasis on mathematics in their curriculum and/or have more meaningful instructional techniques and materials, whereas the United States schools place a comparatively greater emphasis in their curriculum on English usage and/or have more meaningful instructional techniques and materials.

Recommendation: Studies, as previously indicated in the recommendations to Conclusions one and two, are also needed to substantiate or invalidate the implications of this conclusion.

CONCLUSION 4: United States pupils scored comparatively higher on United States tests, British on British tests.

Implication: Tests developed for national groups give advantages to those groups in any international and comparative investigations.

Recommendation: To be most effective in international comparisons, cooperative cross-cultural achievement tests should be developed by the participating countries with an objective being the development of an instrument which would be equally appropriate for all of the participating countries.

CONCLUSION 5: The margin between high and average ability groupings were greater for the British sample.

Implication: The British system of streaming may tend to accelerate achievement of the high ability pupil and depress the average and low-ability student. The reverse may be true in the United States, where emphasis may be placed on the "mass education" of the average student and the "under-dog" low-ability student (with special remedial programs, etcetera).

Recommendation: Again, it is recommended that curriculum, instructional and longitudinal achievement studies be undertaken for further evidence. It is also recommended that American educators interested in the achievement of the gifted might well conduct additional studies relevant to the achievement of high ability students in the British Isles.

CONCLUSION 6: There appeared to be little difference between the achievement of public and private school pupils.

Implication: By and large, public education in both the United States and Great Britain appeared to result in similar academic achievement. Further, future studies may not find it necessary to distinguish between public and private education when comparing pupil achievement.

Recommendation: It is recommended that curriculum, instructional and longitudinal achievement studies be undertaken to ascertain if differences do or do not exist in academic achievement between pupils located in private and public schools.

CONCLUSION 7: Comparatively speaking, United States pupils were strongest on reasoning problems while British pupils were strongest on method problems.

Implication: Cultural traditions, educational methodology and/or curriculum materials may influence more rapid development of reasoning and creativeness in United States pupils and methodicalness and thoroughness in British pupils.

Recommendation: Previously indicated studies are again recommended to consider specific differences in the domain of creative and critical thinking that may exist for a cross-cultural population of school-age pupils.

APPENDIX A

TABLES OF MAIN EFFECT MEANS

Table 69
Main Effect Means, by Source of Variation, For Variables of Reading Vocabulary And Comprehension, Grades 1 - 2, Private Schools

Source of Variation	Vocabulary	Comprehension
Grade	1, 36.9; 2, 59.3	1, 1.4; 2, 8.8
Country	U. S., 46.4; B. I., 52.1	U. S., 4.6; B. I., 6.4
Ability	H, 54.3; A, 41.9	H, 6.6; A, 3.6

Table 70
Main Effect Means, by Source of Variation, For Variables of Arithmetic Reasoning and Fundamentals, Grades 1 - 2, Private Schools

Source of Variation	Reasoning	Fundamentals
Grade	1, 19.3; 2, 31.9	1, 19.4; 2, 34.7
Country	U. S., 25.7; B. I., 25.4	U. S., 24.4; B. I., 33.3
Ability	H, 29.1; A, 22.1	H, 30.5; A, 23.6

Table 71
Main Effect Means, by Source of Variation, For Variables of Mechanics of English And Spelling, Grades 1 - 2, Private Schools

Source of Variation	Mechanics of English	Spelling
Grade	1, 24.8; 2, 38.4	1, 1.7; 2, 8.3
Country	U. S., 31.0; B. I., 32.9	U. S., 3.9; B. I., 7.4
Ability	H, 37.0; A, 26.2	H, 6.2; A, 3.7

Table 72
Main Effect Means, by Source of Variation, For Variables of Reading Vocabulary And Comprehension, Grades 3 - 6, Private Schools

Source of Variation	Vocabulary	Comprehension
Grade	3, 25.2; 4, 33.8 5, 36.9; 6, 42.3	3, 31.7; 4, 42.1 5, 48.4; 6, 55.2
Country	U. S., 35.7; B. I., 35.9	U. S., 49.9; B. I., 43.9
Ability	H, 38.4; A, 30.3	H, 50.8; A, 36.0

Table 73
Main Effect Means, by Source of Variation, For Variables of Arithmetic Reasoning And Fundamentals, Grades 3 - 6, Private Schools

Source of Variation	Reasoning	Fundamentals
Grade	3, 16.4; 4, 25.4 5, 29.1; 6, 32.8	3, 20.2; 4, 28.4 5, 35.1; 6, 49.6
Country	U. S., 29.8; B. I., 25.8	U. S., 33.2; B. I., 36.2
Ability	H, 29.1; A, 23.3	H, 37.6; A, 29.6

Table 74
Main Effect Means, by Source of Variation, For Variables of Mechanics of English And Spelling, Grades 3 - 6, Private Schools

Source of Variation	Mechanics of English	Spelling
Grade	3, 43.3; 4, 63.8 5, 70.9; 6, 82.2	3, 13.2; 4, 18.1 5, 19.4; 6, 23.1
Country	U. S., 74.8; B. I., 64.1	U. S., 18.3; B. I., 19.8
Ability	H, 73.2; A, 57.1	H, 20.4; A, 16.5

Table 75
Main Effect Means, by Source of Variation, For Variables of Reading Vocabulary And Comprehension, Grades 1 - 2, Public Schools

Source of Variation	Vocabulary	Comprehension
Grade	*1*, 30.3; *2*, 57.5	*1*, 1.9; *2*, 8.0
Country	*U. S.*, 40.3; *B. I.*, 48.6	*U. S.*, 4.3; *B. I.*, 5.5
Ability	*H,* 47.1; *A,* 39.7; *L,* 37.0	*H,* 5.9; *A,* 4.0; *L,* 3.1

Table 76
Main Effect Means, by Source of Variation, For Variables of Arithmetic Reasoning And Fundamentals, Grades 1 - 2, Public Schools

Source of Variation	Reasoning	Fundamentals
Grade	*1*, 15.0; *2*, 31.2	*1*, 10.6; *2*, 35.1
Country	*U. S.*, 21.7; *B. I.*, 23.1	*U. S.*, 18.8; *B. I.*, 29.5
Ability	*H,* 25.0; *A,* 20.4; *L,* 19.3	*H,* 23.5; *A,* 19.8; *L,* 19.8

Table 77
Main Effect Means, by Source of Variation, For Variables of Mechanics of English And Spelling, Grades 1 - 2, Public Schools

Source of Variation	Mechanics of English	Spelling
Grade	1, 22.7; 2, 38.0	1, 1.7; 2, 6.9
Country	U. S., 28.4; B. I., 32.8	U. S., 2.7; B. I., 8.3
Ability	H, 34.0; A, 27.9; L, 22.6	H, 5.2; A, 3.5; L, 2.4

Table 78
Main Effect Means; by Source of Variation, For Variables of Reading Vocabulary And Comprehension, Grades 3 - 6, Public Schools

Source of Variation	Vocabulary	Comprehension
Grade	3, 19.6; 4, 26.7 5, 32.9; 6, 38.0	3, 26.3; 4, 33.6 5, 40.5; 6, 48.8
Country	U. S., 29.7; B. I., 32.4	U. S., 39.2; B. I., 38.0
Ability	H, 37.1, A, 28.8	H, 49.5; A, 35.9

Table 79
Main Effect Means, by Source of Variation, For Variables of Arithmetic Reasoning And Fundamentals, Grades 3 - 6, Public Schools

Source of Variation	Reasoning	Fundamentals
Grade	3, 14.6; 4, 21.0 5, 26.4; 6, 30.2	3, 14.9; 4, 25.1 5, 31.7; 6, 41.2
Country	U. S., 24.2; B. I., 24.0	U. S., 27.9; B. I., 34.9
Ability	H, 28.2; A, 23.0	H, 35.4; A, 28.7

Table 80
Main Effect Means, by Source of Variation For Variables of Mechanics of English And Spelling, Grades 3 - 6, Public Schools

Source of Variation	Mechanics of English	Spelling
Grade	3, 36.6; 4, 55.0 5, 65.8; 6, 77.1	3, 9.8; 4, 14.8 5, 18.4; 6, 21.2
Country	U. S., 61.9; B. I., 60.9	U. S., 16.2; B. I., 18.4
Ability	H, 74.2; A, 58.2	H, 20.0; A, 16.0

APPENDIX B

TABLES OF ADJUSTED MAIN EFFECT MEANS

Table 81
Adjusted Main Effect Means, by Source of Variation, For Variables of Reading Vocabulary And Comprehension, Grades 1 - 2, Private Schools

Source of Variation	Vocabulary	Comprehension
Grade	*1*, 65.8; *2*, 64.4	*1*, 11.7; *2*, 11.7
Country	*U. S.*, 65.4; *B. I.*, 64.4	*U. S.*, 11.6; *B. I.*, 11.8
Ability	*H*, 66.1; *A*, 64.1	*H*, 12.2; *A*, 11.1

Table 82
Adjusted Main Effect Means, by Source of Variation, For Variables of Arithmetic Reasoning And Fundamentals, Grades 1 - 2, Private Schools

Source of Variation	Reasoning	Fundamentals
Grade	*1*, 35.9; *2*, 35.6	*1*, 37.9; *2*, 39.2
Country	*U. S.*, 35.8; *B. I.*, 35.6	*U. S.*, 38.8; *B. I.*, 38.0
Ability	*H*, 36.2; *A*, 35.3	*H*, 38.9; *A*, 38.1

Table 83

Adjusted Main Effect Means, by Source of Variation, For Variables of Mechanics of English And Spelling, Grades 1 - 2, Private Schools

Source of Variation	Mechanics of English	Spelling
Grade	*1*, 45.0; *2*, 47.7	*1*, 10.5; *2*, 10.5
Country	*U. S.*, 46.0; *B. I.*, 47.3	*U. S.*, 10.3; *B. I.*, 10.9
Ability	*H*, 48.1; *A*, 44.6	*H*, 10.7; *A*, 10.3

Table 84

Adjusted Main Effect Means, by Source of Variation, For Variables of Reading Vocabulary And Comprehension, Grades 3 - 6, Private Schools

Source of Variation	Vocabulary	Comprehension
Grade	*3*, 42.1; *4*, 41.7 *5*, 42.5; *6*, 44.7	*3*, 53.6; *4*, 53.0 *5*, 54.3; *6*, 56.8
Country	*U. S.*, 41.9; *B. I.*, 43.4	*U. S.*, 53.4; *B. I.*, 55.2
Ability	*H*, 43.9; *A*, 40.4	*H*, 55.6; *A*, 52.0

Table 85
Adjusted Main Effect Means, by Source of Variation, For Variables of Arithmetic Reasoning And Fundamentals, Grades 3 - 6, Private Schools

Source of Variation	Reasoning	Fundamentals
Grade	3, 29.9; 4, 30.8 5, 31.9; 6, 33.0	3, 43.9; 4, 45.9 5, 48.5; 6, 48.9
Country	U. S., 32.1; B. I., 31.3	U. S., 47.5; B. I., 47.0
Ability	H, 32.2; A, 30.1	H, 48.0; A, 45.4

Table 86
Adjusted Main Effect Means, by Source of Variation, For Variables of Mechanics of English And Spelling, Grades 3 - 6, Private Schools

Source of Variation	Mechanics of English	Spelling
Grade	3, 81.4; 4, 79.8 5, 79.7; 6, 80.2	3, 21.5; 4, 21.1 5, 22.4; 6, 20.8
Country	U. S., 79.9; B. I., 80.3	U. S., 20.8; B. I., 21.8
Ability	H, 80.9; A, 78.4	H, 21.7; A, 20.9

Table 87

Adjusted Main Effect Means, by Source of Variation, For Variables of Reading Vocabulary And Comprehension, Grades 1 - 2, Public Schools

Source of Variation	Vocabulary	Comprehension
Grade	*1*, 62.6; *2*, 62.2	*1*, 9.6; *2*, 10.4
Country	*U. S.*, 63.0; *B. I.*, 60.4	*U. S.*, 10.2; *B. I.*, 9.2
Ability	*H*, 63.8; *A*, 62.0; *L*, 60.6	*H*, 10.6; *A*, 9.6; *L*, 9.4

Table 88

Adjusted Main Effect Means, by Source of Variation, For Variables of Arithmetic Reasoning And Fundamentals, Grades 1 - 2, Public Schools

Source of Variation	Reasoning	Fundamentals
Grade	*1*, 33.6; *2*, 34.7	*1*, 36.2; *2*, 37.1
Country	*U. S.*, 34.4; *B. I.*, 33.1	*U. S.*, 36.9; *B. I.*, 35.5
Ability	*H*, 35.0; *A*, 33.5; *L*, 33.3	*H*, 38.2; *A*, 35.6; *L*, 35.2

Table 89
Adjusted Main Effect Means, by Source of Variation, For Variables of Mechanics of English And Spelling, Grades 1 - 2, Public Schools

Source of Variation	Mechanics of English	Spelling
Grade	1, 44.5; 2, 46.6	1, 9.4; 2, 11.7
Country	U. S., 45.5; B. I., 45.0	U. S., 10.4; B. I., 10.3
Ability	H, 47.0; A, 45.0; L, 42.7	H, 11.4; A, 9.8; L, 9.6

Table 90
Adjusted Main Effect Means, by Source of Variation, For Variables of Reading Vocabulary And Comprehension, Grades 3 - 6, Public Schools

Source of Variation	Vocabulary	Comprehension
Grade	3, 35.0; 4, 34.9 5, 35.2; 6, 35.0	3, 44.5; 4, 45.6 5, 46.5; 6, 45.5
Country	U. S., 34.6; B. I., 36.0	U. S., 46.2; B. I., 44.3
Ability	H, 36.7; A, 34.6	H, 47.0; A, 45.2

Table 91

Adjusted Main Effect Means, by Source of Variation, For Variables of Arithmetic Reasoning And Fundamentals, Grades 3 - 6, Public Schools

Source of Variation	Reasoning	Fundamentals
Grade	3, 27.2; 4, 27.7 5, 28.5; 6, 27.9	3, 38.2; 4, 37.4 5, 39.6; 6, 41.3
Country	U. S., 28.0; B. I., 27.5	U. S., 39.7; B. I., 38.2
Ability	H, 29.4; A, 27.4	H, 40.2; A, 38.9

Table 92

Adjusted Main Effect Means, by Source of Variation, For Variables of Mechanics of English And Spelling, Grades 3 - 6, Public Schools

Source of Variation	Mechanics of English	Spelling
Grade	3, 72.5; 4, 71.7 5, 72.9; 6, 71.3	3, 18.0; 4, 18.3 5, 18.6; 6, 18.2
Country	U. S., 72.8; B. I., 70.1	U. S., 18.2; B. I., 18.5
Ability	H, 73.6; A, 71.5	H, 19.1, A, 18.0

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